

IMPLEMENTATION OF AN EVIDENCED-BASED POST STROKE DEPRESSION
SCREENING PROTOCOL AT THE QUEEN'S MEDICAL CENTER

A DOCTOR OF NURSING PRACTICE PROJECT SUBMITTED TO THE OFFICE OF
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Dedication

I would like to dedicate this work to Estelle for being an inspiration and light in my life and to my fiancé Eve for ceaselessly supporting me while I walk my path.

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I would like to acknowledge the tremendous level of support and effort this project received from The Queen's Medical Center neurological intensive care unit providers and staff. Jennifer Moran, The Queen's Medical Center stroke program coordinator, deserves a special thank you for her belief in this project and her continual drive to improve the care for her stroke patients.

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Abstract

Post stroke depression (PSD) has been identified as the most prevalent psychiatric consequence of having had a stroke. Up to one third of all stroke survivors will experience depressive symptoms at some point during their recovery. When left untreated, PSD can be devastating to a stroke survivor's rehabilitative process. The purpose of this Doctor of Nursing Practice project was to implement a PSD screening protocol at The Queen's Medical Center (QMC) to address these potential issues. Objectives of this project included establishing an in-patient PSD screening protocol at QMC, encouraging continuity of PSD screening in the outpatient setting, and increasing provider comfort discussing and screening for PSD.

Guiding this project from inception to finish was the IOWA model of evidenced based care. Through following the model's steps, the project's PSD team was able to create a standardized PSD screening protocol that was integrated into the workflow of QMC neurological intensive care unit providers. The protocol included the PHQ-2, which was used to screen all eligible patients with a primary diagnosis of stroke prior to their discharge.

Over a four-month interventional period 86 patients were screened with the new evidence-based protocol. Of those patients 61 were able to participate in the PHQ-2 screen. The prevalence of depressive symptoms in this group was 11.5%. This project was able to reach a 93% provider screening compliance rate by project's end. Survey results from providers as well as anecdotal provider feedback during team meetings showed an increase in provider comfort discussing and screening for PSD over the course of the interventional period.

Results of this project indicate that PSD, a condition typically poorly addressed, is a real concern in the Hawai'i population and that screening for it in the acute care setting is feasible. This project represents the first attempt at measuring a prevalence rate for PSD in a Hawai'i

acute care facility. Limitations of this project and its results include a limited interventional period, poorly validated depression screening tool for stroke patients, and decreasing hospital stays related to improved stroke care. Each of these may have contributed to the lower than expected prevalence rate for PSD in this acute care setting.

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List of Abbreviations

CDC - Center For Disease Control And Prevention

DMP - Data Management Plan

DNP - Doctor of Nursing Practice

EMR - Electronic Medical Record

ICU - Intensive Care Unit

PCP - Primary Care Provider

PHQ-2 - Public Health Questionnaire 2

PHQ-8 - Public Health Questionnaire 8

PHQ-9 - Public Health Questionnaire 9

PSD - Post Stroke Depression

QCIPN - Queens Clinically Integrated Physician Network

QI - Quality Improvement

QMC – The Queen’s Medical Center

RCT – Randomized Controlled Trial

RN – Registered Nurse

Chapter One. Executive Summary

Introduction

This chapter is an introduction to the Doctor of Nursing Practice (DNP) project presented in this text. It begins with a discussion about the background of post stroke depression (PSD) and its consequences. The chapter then introduces the theoretical frameworks used, literature review and synthesis process, and the project's proposed innovation and objectives. Following these sections is a brief overview of the methods utilized, results gathered, and a final discussion about the project.

Background and Problem

Depressive symptoms are among the most prevalent behavioral health consequences of having had a stroke (Paolucci, 2008). The most consistently cited prevalence rate for the development of depression after stroke is 33% and comes from a 2005 systematic review by Hackett, Yapa, Parag, and Anderson. Untreated PSD is associated with increased hospital stays, delayed stroke rehabilitation, decreased quality of life, increased mortality risk, and an increased burden on the healthcare system (Hollander, 2014; Morris, Robinson, Andrzejewski, Samuels, & Price, 1993; Robinson & Jorge, 2016). These associations are profound given that many individuals with PSD go undiagnosed and therefore untreated (El Hussein et al., 2012; Herrmann et al., 2011). The purpose of this evidence-based project was to develop and implement a PSD screening protocol at The Queen's Medical Center (QMC) to assess the prevalence of PSD and to mitigate its effects on stroke patient's recoveries.

Conceptual Framework

This project included elements from three distinct conceptual models. The IOWA model of evidence-based practice, Rogers Diffusion of Innovation Theory, and the Centers for Disease Control and Prevention's (CDC) framework for program evaluation.

Literature Review and Synthesis

The databases PubMed, CINAHL, Cochrane Review, and Google Scholar were utilized to gather relevant literature pertaining to the purpose statement previously presented. After reviewing the abstracts of 382 articles, 28 were chosen for individual critique. The literature review was systematic and there were explicit inclusion and exclusion criteria utilized.

Innovation and Objectives

Objectives of this project were to establish an in-patient PSD screening protocol in the QMC neurological intensive care unit, encourage continuity of PSD screening and care to the outpatient setting, and to increase provider comfort discussing and screening for PSD with their patients. The successful implementation of a standardized PSD screening protocol, that utilized the Public Health Questionnaire 2 (PHQ-2) prior to discharge, and the provision of educational in-services for providers helped fulfill these objectives.

Methods

Design

Guiding each step of this project was the IOWA model of evidence-based practice as described by Titler et al. (2001). Rogers' (2003) Diffusion of Innovation model was additionally used to enhance the diffusion of this project's innovation. A final and thoughtful evaluation of this project was then accomplished using the CDC's framework for program evaluation.

Practice Change Description

Prior to this project QMC did not address the potential for PSD with a standardized screening protocol. To close this gap in behavioral health surveillance the PSD project team created a PSD screening protocol to assist QMC neurology intensive care unit (ICU) providers. During discharge, providers followed a PSD screening protocol that was integrated into their discharge summaries located in the electronic medical record (EMR). As per the protocol all patients were provided with verbal and written education regarding PSD. Patients were then screened with the yes/no PHQ-2 tool. When patients scored a 0 on the PHQ-2 the screening process would end and the interaction documented. Patients that scored greater than 0 would be offered a one-month SSRI prescription and have their primary care providers (PCP) notified directly. The interaction would then be documented in the discharge summary.

Setting and Sample

QMC's stroke program was the primary medical setting where data was collected for this project and included 12 neurology unit providers, the stroke program coordinator, and all neurology unit registered nurses (RN). During an average month in 2016 this team cared for 50 patients with a primary diagnosis of stroke.

The target population for this project included all eligible patients with a primary diagnosis of stroke that were to be discharged by QMC neurological ICU providers. Exclusion criteria for this population included an inability to meaningfully participate in a PSD screening per provider judgment. Twelve providers were responsible for PSD screening over the four-month intervention period during which time they screened 86 eligible patients.

Data Collection

The PSD team, using stakeholder feedback, created a comprehensive data management plan to ensure this project's findings would be valid and credible. Data was predominately extracted from the EMR where patient discharge summaries were used to compile aggregate PHQ-2 results and protocol compliance rates. Data was reviewed at four intervals in a locked office by team members with proper authorization to access patient charts. Patient confidentiality was maintained through de-identification of all data prior to dissemination to PSD team members.

Results

There were a total of 86 patients screened during this four-month project. Of those 86 patients there were 61 that were able to participate in the PHQ-2 screening process. The positive screen rate for those 61 patients was 11.5%. Overall screening compliance in the provider group was 86%, however, over the last four weeks of the project compliance had reached 93%. Provider comfort discussing and screening for PSD increased steadily throughout this project as evidenced by an increase in pre and post intervention survey results as well as anecdotally via provider feedback during team meetings.

Discussion

The purpose of this project was fulfilled through the successful creation and integration of a standardized PSD screening protocol into the workflow of QMC neurological ICU providers. Although a third of the prevalence rate reported in national data, the 11.5% prevalence rate found in this project shows that PSD is present in the Hawai'i population. Deficiencies in the screening tool utilized, short interventional period, and decreasing lengths of stay for stroke patients may partially explain the lower local prevalence rate. This project's objectives of

increasing provider comfort with PSD and in achieving a 90% compliance rate were met. The objective of encouraging ongoing outpatient PSD screening cannot, unfortunately, be proven due to a lack of follow-up data. It is the hope of this project that outreach interventions targeting the outpatient providers had and will continue to have a positive effect on outpatient PSD screening rates. In summary, this project successfully implemented a standardized and evidence-based PSD screening protocol at QMC that helped to close an identified gap in care for stroke patients.

Chapter 2. Problem

Introduction

PSD, although widely unappreciated until recently, is a highly prevalent psychiatric consequence of having had a stroke (Towfighi et al., 2017). As is often the case, its consequences can be devastating to the rehabilitative process should recognition and treatment be delayed (Hollander, 2014; Robinson & Jorge, 2016). The purpose of this evidence-based project is to develop and implement a PSD screening protocol at QMC to address this potential problem. The following chapter will review the background of PSD and its consequences, describe the related body of literature with a critique and synthesis, and provide an evidence-based practice change recommendation.

Conceptual Model

The IOWA model of evidence-based practice was selected as the conceptual roadmap to guide the implementation of a PSD screening protocol for this Doctor of Nursing Practice project. As developed and described by Titler et al. (2001) and represented in Figure 1, the IOWA model is a systematic stepwise approach that guides clinicians in their pursuit to improve patient outcomes through the utilization of the current evidence base. The first step in this model, and a key feature that sets it apart from other evidence-based practice frameworks, is to identify the knowledge or problem focused clinical triggers that signal the need for a change in practice (Titler et al., 2001). Once triggers are identified, a practice change topic selected, and enough interest gained there remain six steps in the process: 2) forming a team, 3) literature search, 4) literature review and critique, 5) practice change recommendation, 6) piloting the change with evaluation and subsequent full-scale implementation, and 7) evaluation of project (Titler et al., 2001).

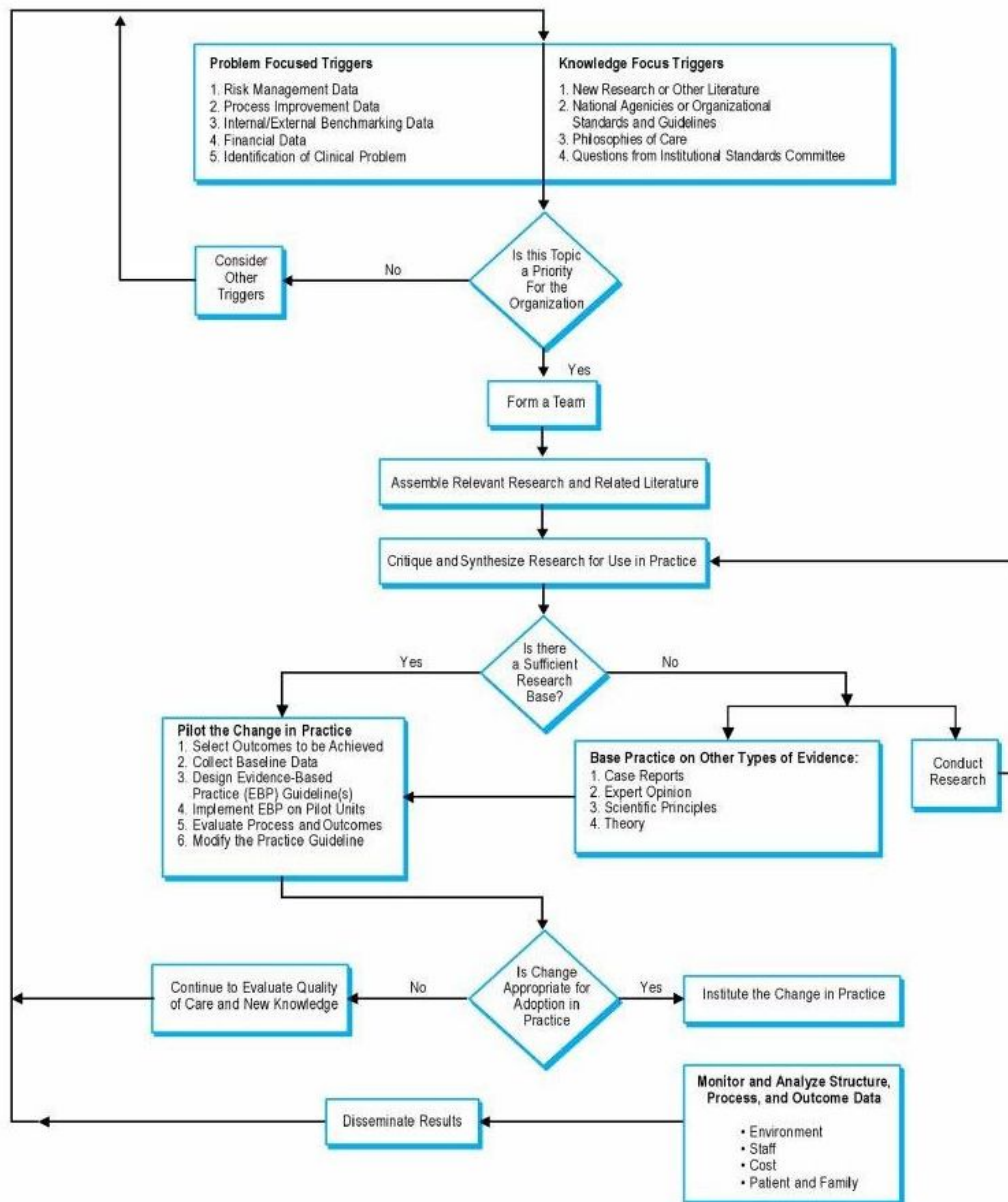


Figure 1. The Iowa Model for Evidence-Based Practice as adapted from “The Iowa Model of Evidence-Based Practice to Promote Quality Care” by Titler, et. al, 2001. *Critical Care Nursing Clinics of North America*, 13(4), 497-509. Used/reprinted with permission from the University of Iowa Hospitals and Clinics, copyright 1998. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at [319-384-9098](tel:319-384-9098).

Background and Problem

Individuals who have suffered a stroke are confronted with a life-changing event that has the potential to alter their biochemistry and challenge their psychological coping abilities. When these systems malfunction or are overwhelmed, the stroke survivor is at an increased risk for the development of various mood disorders beyond that of the general population (Paolucci, 2008). The most prevalent of these, associated as a consequence of having had a stroke, is the development of a depressive disorder (Paolucci, 2008). PSD, as is the accepted phrase, has been appreciated in the literature for nearly one hundred years (Robinson & Jorge, 2016). The emphasis on screening for and treatment of, however, has only recently gained attention. This is in part due to the fact that for many years PSD was thought to be an inevitable consequence of having had a stroke.

Beginning in the 1980's, double blind randomized controlled trials (RCT) showing the efficacy of antidepressants in the treatment of PSD began to shift professional opinions on the issue (Robinson & Jorge, 2016). The increased interest in PSD and its potential to be addressed led to further studies that illustrated the detrimental effects of depression on stroke rehabilitative outcomes. Untreated PSD has since been associated with increased hospital stays, delayed stroke rehabilitation, decreased quality of life, and an increased burden on the healthcare system (Hollander, 2014; Robinson & Jorge, 2016; Towfighi et al., 2017). Perhaps most striking is that the presence of PSD has been associated with a 3.4 times increase in 10-year mortality following a stroke (Morris, Robinson, Andrzejewski, Samuels, & Price, 1993). These findings, including its treatability and potential for considerable harm, led more recent researchers to ask the questions of how prevalent is PSD and how can healthcare professionals screen for it?

The most often cited prevalence rate for PSD is 33% and comes from a systematic review of case series and incidence reports performed by Hackett, Yapa, Parag, and Anderson (2005). Their pooled estimate was derived from national and international hospital, rehabilitative, and general population statistics and represents the prevalence of depressive symptoms at any given point in a 5-year post-stroke period. Work done by Ayerbe, Ayis, Rudd, Heuschmann, and Wolfe (2011) further suggest that although the point prevalence is generally accepted to be 33%, it is likely that up to half of all stroke survivors experience depressive symptoms at some point during that same time frame. This is partially explained by the differential development temporally of depressive symptoms post-stroke and that some courses of depression have been shown to resolve spontaneously (Hackett et al., 2005). It is worth noting that although spontaneous remission has been reported for PSD, the potential benefits of early treatment for those cases is ill addressed in the literature.

The anytime stroke prevalence in the state of Hawai'i during 2014, with a population of 1,110,200 people, was 3.1% (95% CI 2.6 to 3.6; Hawai'i Health Data Warehouse, 2016). In Honolulu County on the island of Oahu where QMC is located, the stroke prevalence that same year was 3.3% in a population of 736,400 people (95% CI 2.6 to 4; Hawai'i Health Data Warehouse, 2016). If the accepted PSD prevalence rate is 33%, then it can be reasonably assumed that up 11,357 people in Hawai'i and 8,019 people in Honolulu County in 2014 were or became affected by depressive symptoms as a result of their stroke. These numbers are even more profound given that many individuals with PSD go undiagnosed and therefore untreated (El Hussein et al., 2012; Herrmann et al., 2011).

A secondary study of a multicenter prospective cohort registry by El Hussein et al. (2012) claims a possible missed detection rate of nearly 80% in all PSD cases. This was

determined by comparing positive Public Health Questionnaire 8 (PHQ-8) screens with the prescription of antidepressant medications at 3 and 12-month follow-ups. The study was not without limitations but is similar to the findings described by Herrmann et al. in 2011. In their study, just 4.8% of Canadian registry stroke patients were diagnosed with PSD. Using the generally accepted prevalence rate, the authors concluded that there was an apparent and significant gap in the detection of PSD (Herrmann et al., 2011).

Baseline Data

Prior to this project's intervention QMC did not screen for PSD in their inpatient stroke population. The number of patients screened prior to discharge in 2016, the latest year with available data, was in fact zero. They did and still do, however, do a brief screen with the PHQ-2 and PHQ-9 within 1 week of discharge and again at 30 days via a telephone follow up call. Unfortunately, due to difficulties in reaching patients the follow up phone call success rate is rather low. Outpatient screening rates are even lower in the Queens Clinically Integrate Physician Network (QCIPN) where in 2016 just one screen was completed during 108 encounters. Between 2011 and 2015 there were an average of 450 patients that were admitted to QMC with a primary diagnosis of ischemic stroke. Another 200 were admitted with a primary diagnosis of either intracerebral hemorrhage or subarachnoid hemorrhage. Of these patients, the average length of stay was 6.57 days and the average age was 69. The ratio of male to female patients was nearly equal.

Project Triggers

Titler et al. (2001) describes two types of triggers that may signal the need for a practice change evaluation. Knowledge-based triggers include external signals to change that may come from new research or new guidelines. Problem-based triggers arise from internal clinical issues

that can include quality improvement, financial burden, or risk management (Titler et al., 2001). This evidence-based PSD project includes both types of triggers as will be discussed.

TJC's comprehensive stroke center certification requirement to screen for PSD was the initial impetus and first knowledge-based trigger for the consideration of this project. The second knowledge-based trigger, as discussed previously, came from an initial literature review that showed PSD contributes significantly to poor stroke-patient health outcomes (van de Weg, Kuik, & Lankhorst, 1999). Knowledge of the severity of consequences associated with untreated PSD, its prevalence rates, and the lack of adequate detection led to an initial recommendation to find the best evidence-based solution to screening for PSD in stroke patients at QMC.

Search Strategy

The databases PubMed, CINAHL, Cochrane Review, and Google Scholar were utilized to gather relevant literature pertaining to the purpose statement presented. The search included combining the terms depression and stroke with screening, questionnaire, or survey. Additional search terms included systematic review, RCT, and PSD. Exclusion search parameters attempted to avoid literature pertaining to the treatment of PSD including intervention types and their effects. There were no limits set on the years of publication. After reviewing the abstracts of 382 articles found searching each database, 28 were chosen for individual critique. This search was systematic and there were explicit inclusion and exclusion criteria used as mentioned above.

Grading Tool

Melnik's Hierarchy of Evidence for Intervention Studies was utilized to organize and grade the critiqued articles. This tool ranks evidence into categories that include systematic review or meta-analysis (level I), RCT (level II), controlled trial without randomization (level III), case control or cohort study (level IV), systematic review of qualitative or descriptive

studies (level V), qualitative or descriptive studies (level VI), and expert opinions (level VII; Stillwell, Fineout-Overholt, Melnyk, & Williamson, 2010). Figure 2 represents the number of articles critiqued and their level of evidence.

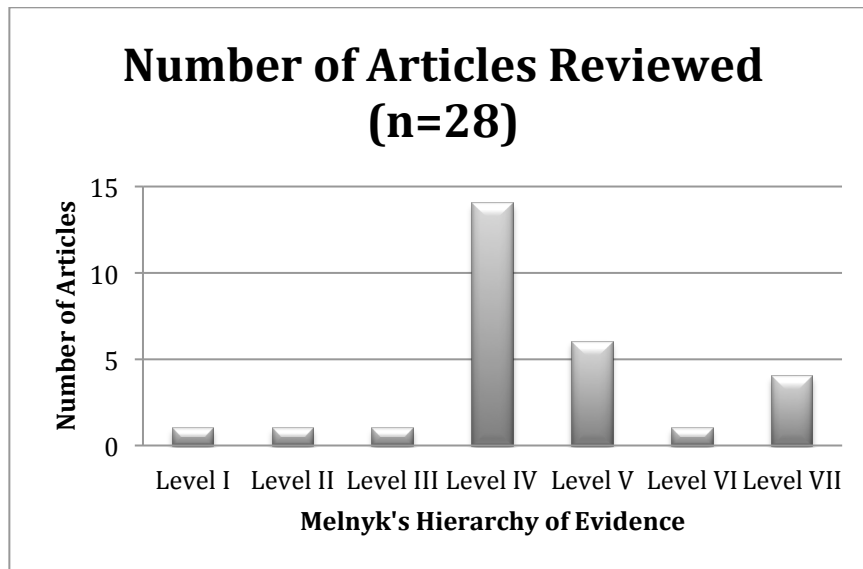


Figure 2. Number of articles reviewed and their corresponding levels of evidence.

Literature Synthesis

The final body of literature synthesized here represents studies that address the specific instruments for the screening of PSD, their validity, when they should be administered, and considerations for non-verbal patients. A discussion of the overall quality, quantity, and consistency as well as the limitations of the body of literature is also presented.

Post Stroke Depression Screening

Upon review of the body of literature, 24 different screening instruments utilized to capture PSD were identified. These instruments and the studies that utilized them are represented in Appendix A. Screening instruments were either self-administered, interviewer administered and scored, or a structured clinical interview by trained professional was conducted. The

instruments vary in their complexity from the 2-item PHQ-2 to the 28-item General Health Questionnaire. The four most recently studied instruments include the Beck's Depression Inventory, Hamilton Anxiety and Depression Scale, Geriatric Depression Screen, and the Public Health Questionnaire 9 (PHQ-9; Meader, Moe-Byren, Llewellyn, & Mitchell, 2014, Level I). In the majority of studies utilizing the PHQ-9, the PHQ-2 was administered first as a pre-screening instrument. Considerations for choosing an appropriate instrument to be used in this evidence-based project include how well the instrument is validated for the stroke patient population, the instrument's ease of use, and the preferences of those utilizing the final PSD protocol.

Validity and Cutoff Scores

To date, there is no screening instrument specifically designed and validated for the PSD patient population (Towfighi et al., 2017, Level IV). The majority of the literature presented here instead chose to attempt validation of currently accepted general population depression scales for stroke patients. Although methodologies varied considerably, the gold standard to achieve such validation in the literature was to compare the screening instrument's results with a structured clinical interview utilizing the 3rd, 4th, or 5th Diagnostic and Statistical Manual of Mental Health Disorders as references (Berg, Lonnqvist, Palomaki, & Kaste, 2009, Level IV; de Man-van Ginkel, et. al, 2012, Level IV; Kang, et. al, 2012, Level 4; Lewis-Richter, Volz, Jobges, & Werheid, 2014, Level 4; Meader, et. al, 2014; Turner et. al, 2012, Level III). Given the potential for significant adverse outcomes associated with delayed diagnosis and treatment of PSD, a screening tool with the highest sensitivity is necessary.

The only meta-analysis represented in this body of literature pooled the sensitivity and specificity results of PSD screening instruments in all available studies having to do with PSD detection (Meader, et. al, 2014). Results of the analysis concluded that the Center for

Epidemiological Studies Depression Scale (sensitivity: 0.75; 95% CI 0.60 to 0.85; specificity: 0.88; 95% CI 0.71 to 0.95), the Hamilton Depression Rating Scale (sensitivity: 0.84; 95% CI 0.75 to 0.90; specificity: 0.83; 95% CI 0.72 to 0.90), and the PHQ-9 (sensitivity: 0.86; 95% CI 0.70 to 0.94; specificity: 0.79; 95% CI 0.60 to 0.90) were shown to be the three most reliable scales for detecting PSD (Meader et al., 2014).

Interestingly, the Meader et al. (2014) study found the multi-item PHQ-2 to underperform in the stroke patient population as compared to the primary care population (sensitivity 0.79; 95% CI; specificity 0.76; 95% CI). The original yes/no version of the PHQ-2 has been poorly studied in PSD but did prove useful in an analysis of depression in 1024 participants with coronary heart disease enrolled in the Heart and Soul Study, of which 14% had a history of stroke (sensitivity 0.90; 95% CI; specificity 0.69; 95% CI; Towfighi et al., 2017).

An important consideration for any screening instrument is how to interpret the scores gathered. The cutoff values used to determine the potential presence for depression and its severity affect the sensitivity and specificity of the instruments used. For the majority of the studies pre-established instrument specific cutoff scores were utilized (Meader et al., 2014). The studies that chose to use different cutoff values did so to attempt to account for the overlapping somatic symptomology of stroke outcomes and depression. To do so, instruments that included somatic items were given higher cutoff values for depression. In general it was found that this reduced the overall reliability of the instruments (Kang et al., 2012). As for the PHQ-9, a cutoff value of greater than or equal to 10 was used to indicate depression in the majority of studies (de Man-van Ginkel et al., 2012, Level IV; El Hussein et al., 2012, Level IV; Hollender, K., 2012, Level V; Karamchandani et al., 2015, Level VI; Turner, et al., 2012; Williams, et al., 2005, Level II).

Timing

The appropriate time for an initial screening and subsequent interval screenings is unfortunately not answered directly by this body of evidence. There are instead four guidelines that simply recommend screening for mood disorders in post-stroke patients prior to their discharge from the hospital after acute event (Heart and Stroke Foundation of Ontario & Registered Nurses' Association of Ontario, 2011, Level VII; Intercollegiate Stroke Working Party, 2012, Level VII; Scottish Intercollegiate Guidelines Network, 2010, Level VII; VA/DoD Clinical Practice Guideline, 2010, Level VII). None of these guidelines reference evidence to support their recommendations in relation to mood disorder screenings nor do they offer advice as to follow up evaluations for depression in the outpatient setting. The remainder of literature represents studies with screening intervals ranging from within 5 days to 5 years post-stroke (Meader, et. al, 2014). For the purpose of this evidence-based intervention, the mandate by TJC to screen for PSD prior to discharge to qualify for comprehensive stroke certification will serve as the temporal guide.

Non-Verbal Patients

Significant consequences of having a stroke include the inability to communicate verbally and the potential for severe cognitive impairment. Unfortunately, the majority of studies pertaining to PSD have eliminated these patients from their inclusion criteria. Represented in this body of literature are just four articles that attempted to validate or compare the validities of PSD instruments for the non-verbal stroke patient (Bennett & Lincoln, 2006, Level V; Bennett, Thomas, Austen, Morris, & Lincoln, 2006, Level V; Berg, et al, 2009; Hacker, Stark, & Thomas, 2010, Level IV). The 3 instruments examined most thoroughly in these studies included the signs of depression scale, the stroke aphasic depression questionnaire, and the visual analogue mood

scale (VAMS). None of these scales have been adequately validated, however in the capacity that they have the VAMS scale outperformed the other two (sensitivity: 0.77; 95% CI; specificity: 0.82; 95% CI; Bennett & Lincoln, 2006).

Body of Literature and Limitations

High-level studies with consistent methodologies are absent in the body of literature gathered and presented here in relation to PSD. The majority of the articles are cohort studies with convenience samples. Patient populations can rarely be generalized to the greater population and even less so to Hawai'i. Although the body of evidence appears to have an adequate quantity of studies, there are few that attempt to answer the same question. With 24 different scales, there are few studies to compare with one another in relation to any one individual scale or setting. There were, however, enough studies for Meader et al. (2014) to run statistical analyses on the Center for Epidemiological Studies Scale, Hamilton Depression Rating Scale, and the PHQ-9 instruments. What this body of evidence lacks in quality it makes up for in consistency in relation to its reports on the prevalence of PSD, consequences of untreated depression, validity of the PHQ-9 instrument, and the conditions for which PSD should be screened.

Evidence-Based Protocol

QMC requires a PSD screening protocol to continue to qualify as a comprehensive stroke center. This primary knowledge-based trigger was the impetus for synthesizing the body of literature related to PSD to develop an evidence-based intervention that would meet TJC's guidelines and best serve each patient's wellbeing. Given the continued lack of awareness about the prevalence and treatability of PSD, as evidenced by low detection rates, it was reasonable and prudent to implement an inpatient screening protocol at QMC (El Husseini et al., 2012;

Herrmann et al., 2011). The protocol serves to establish a mood baseline, refer patients to behavioral health as needed, and to begin the conversation with patient, patient's family, and the healthcare staff about the potential for and serious consequences of untreated PSD. The following initial recommendation was a product of the literature review presented as well as on-going QMC stakeholder feedback.

Recommendation

Prior to discharge from QMC, a neurology unit provider will screen all eligible patients with a primary diagnosis of stroke for PSD using the yes/no PHQ-2 questionnaire. Although not yet consistently validated in the body of literature for the PSD population, the PHQ-2 is efficient enough to administer during a packed discharge workflow. Regardless of the score recorded, each patient and their family will be given an educational pamphlet and discussion regarding PSD. Patient and staff education that encourages ongoing surveillance for PSD will be the foundation of this intervention given that the body of literature shows a consistent and ongoing 33% PSD prevalence rate through five years post-stroke (Hackett et al., 2005).

All PHQ-2 scores will be recorded in the patient's discharge summary that will then follow them to their outpatient providers. Patients that score greater than 0 on the PHQ-2, indicating a potential for depression, will be encouraged to follow up with their PCP immediately for further evaluation (Meader et al, 2013). Using an electronic notification system each patient's PCP will be notified directly of positive screening results. These patients will additionally be offered a one-month SSRI prescription to mitigate their increased risk for PSD during their transition in care. Each patient's PCP and/or behavioral health specialist will determine ongoing SSRI use and need. The prescription of SSRIs to treat and possibly prevent

the development of PSD is supported by a meta-analysis by Juangco, Ang, Efendy, and Cuanang (2015; RR 0.36, 95% CI 0.22-0.60).

Should the patient endorse suicidal ideation, an immediate psychiatric consult will be ordered prior to the patient's discharge. If the patient is unable to complete the PHQ-2 due to the consequences of their stroke, patient and family education will still be reviewed. There is currently no adequately validated non-verbal PSD screening instrument recommended by the literature. These patients and their family members will be encouraged to discuss the potential for PSD with their PCPs. The sum product of each of these interventions is a PSD screening protocol that establishes a conversation about, and baseline assessment of, ongoing PSD risk. It will do this by encouraging ongoing assessment in the outpatient setting through active communication between QMC and outpatient providers.

Summary

This chapter has described the extent of the problem of PSD, provided a review, critique, and synthesis of the related body of literature, and outlined an evidence-based practice change recommendation to address PSD. This project will attempt to screen all eligible stroke patients for PSD prior to their discharge utilizing a validated depression-screening instrument. In doing so, the purpose of this project to develop and implement a PSD screening protocol at QMC will be fulfilled.

Chapter 3. Methods

Introduction

Post stroke depression (PSD) is appreciated as a highly prevalent psychiatric consequence following an acute stroke event (Towfighi et al., 2017). When left undetected and untreated, PSD can have devastating consequences on a patient's rehabilitative process (Hollander, 2014; Robinson & Jorge, 2016). The purpose of this evidence-based project was to develop and implement a PSD screening protocol at The Queen's Medical Center (QMC) to address this potential problem. In the interest of designing and implementing a lasting and successful practice change, the IOWA model of evidence-based practice was selected as the conceptual roadmap to guide this project (Titler et al., 2001).

Figure 3 presents both the components of this project's purpose statement and the outcomes associated with its objectives. As identified from the literature, there is a sizable gap in care for stroke patients that develop depression (El Hussein et al., 2012; Herrmann et al., 2011). This gap is in part due to a fundamental lack of appreciation related to the treatability of PSD and an absence of appropriate surveillance systems for it (Robinson & Jorge, 2016).

The main objectives of this evidence-based project, meant to address the needs of PSD patients and their families, were to establish an in-patient PSD screening protocol at QMC, encourage continuity of PSD screening and care to the outpatient setting, and to increase provider comfort discussing and screening for PSD with their patients. In this chapter the purposed practice change, a step-by-step IOWA model integrated implementation plan, and Center for Disease Control and Prevention (CDC) guided evaluation plan will be described. This chapter will then conclude with a review of resource needs, human subject considerations, and project limitations.

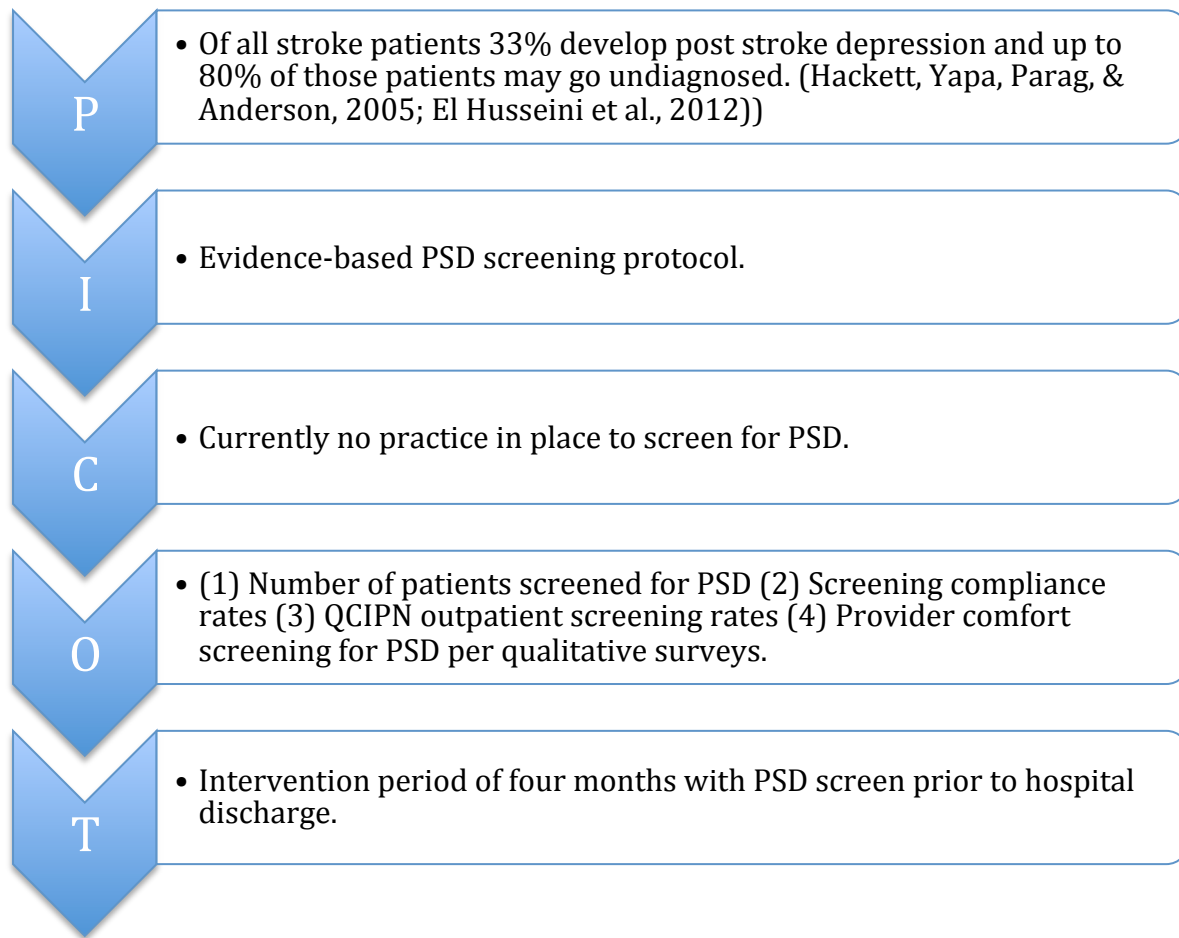


Figure 3. Problem (P), intervention (I), comparison (C), outcomes (O), and timing (T) statement utilized to formulate purpose statement and to guide literature review.

Implementation Plan

Overview

Within the scope of this project, the implementation of a PSD screening protocol at QMC included elements from three distinct conceptual models. Discussed in chapter 2, the IOWA model of evidence-based practice is the first of these and was chosen to be the master template and systematic step-wise guide. The second conceptual model, embedded within the implementation step of the first, is the Rogers Diffusion of Innovation Theory. Rogers (2003)

provides in his work considerations to improve the rate and success of adoption of a new innovation. The CDC's framework for program evaluation is the third conceptual model and was chosen to direct the evaluation step of the IOWA model.

Project Design

The rationale for choosing the IOWA model to implement a PSD screening protocol at QMC is that this was an EBP meant to guide evidence-based practice. This is an important distinction to make, as there are other project designs available to answer the same clinical question. Each of which, including research and quality improvement (QI) designs, have valid strengths and limitations. Here, both research and QI designs were excluded, as the former would not have fulfilled the temporal needs of this project's objectives and the latter requires local data on an established process to improve outcomes (Newhouse, 2007). Considering this project's objectives were to establish an intervention intended to meet the immediate needs of an organization and to close a recognized gap in care, it was prudent to choose an evidence-based project design. Evidence-based practice requires utilizing the best available evidence in conjunction with organizational priorities and patient preferences to solve clinical problems (Newhouse, 2007).

Practice Change and Characteristics

In chapter 2, a review and critique of the literature informed the creation of a PSD screening protocol, the finalized version of which can be found in Appendix B. To summarize, the protocol involves screening all stroke patients at QMC for depression with the Public Health Questionnaire - 2 (PHQ-2) prior to their discharge and includes a step-by-step guide of interventions to be completed based on screening results. To encourage patient education and to facilitate the patient/provider conversation regarding PSD an educational handout was created

and integrated into the final screening protocol. The educational handout was translated into three languages, placed into patient admission packets, and can be found here in Appendix C.

In an effort to enhance this project's chances of a successful implementation, consideration for Rogers (2003) five characteristics of a successful innovation was given throughout the creation process. Each of Rogers' characteristics, as discussed in his Diffusion of Innovation Theory, are meant to decrease uncertainty about a new innovation and thereby increase its rate of adoption (Rogers, 2003). Rogers' theory was chosen to aide in the implementation plan as both it and this project dealt with changing human behavior.

Relative advantage. To paraphrase Rogers (2003), the relative advantage of an innovation is defined as the degree to which something new is perceived as better than the thing it is meant to replace. In the case of this evidence-based project, the something new is the implementation of a PSD screening protocol and the something old is the absence of PSD screening altogether. Aside from the obvious advantage of doing something to address a clinical problem rather than not, the question of why screen at all could be proposed. For QMC, this potential question was answered by the fact that PSD screening prior to discharge is mandated by The Joint Commission (TJC) to maintain comprehensive stroke center status. More important reasons to screen for PSD include the fact that current practices of PSD screening are deficient and that untreated PSD is extremely harmful to a patient's rehabilitative process (El Hussein et al., 2012; Towfighi et al., 2017).

Compatibility. Rogers (2003) describes compatibility as the degree to which a new innovation is consistent with a potential adopter's values and needs. In the case of this project, the primary adopters will be the individuals administering the screening protocol. Secondary adopters will include the patient's primary care and behavioral health providers, as they will be

the ones extending the care continuum started by QMC. Although the primary adopters will be mandated to carry out the screenings, the motivation for the innovation is consistent with the wellness-oriented values of QMC that each employee is meant to embody.

Complexity. Rogers (2003) discusses the characteristic of complexity and notes that the actual and perceived complexity of a new innovation is inversely related to its rate of adoption. This is where a discussion of which screening tool to use and why was helpful in formulating a finalized intervention. Integrating anything new into the workflow of a hospital staff member needs to consider ease of use, effectiveness, and efficiency. The PHQ-2 that has been chosen for this project may be administered by anyone, is partially validated in the stroke patient population, and takes less than five minutes to administer and document (Meader et al., 2014). Relative to other screening options, this is the least complex solution and most desired by the QMC neurology providers.

Trialability. Adopters appreciate trying innovations out prior to committing to behavior change (Rogers, 2003). This trialing period is consistent with the piloting the change step of the IOWA model that is apart of this project's implementation plan. During the pilot stage, the PSD screening protocol will be initiated on a single unit. This will allow for user feedback and reinvention as needed.

Observability. The degree to which the results of an innovation are visible to others is the final characteristic discussed by Rogers (2003). The more visible, the faster adoption is thought to occur. This is the weakest characteristic of the project as the outcomes of the screening process are meant to prevent the negative repercussions of untreated PSD. To account for this barrier, the PSD screening protocol will be introduced to all staff, including Queens

Clinically Integrated Physician Network (QCIPN) providers, through educational sessions that highlight its importance.

IOWA Model Integrated Strategy for Implementation

Each of the steps in the IOWA model of evidence-based practice change are discussed separately here as they relate to the implementation of a PSD screening protocol at QMC. As a review, the first step in the model is to identify clinical triggers that signal a need for change relating to a practice topic (Titler et al., 2001). Once triggers are identified, a practice change topic selected, and enough interest gained there remain six steps in the process: 2) forming a team, 3) literature search, 4) literature review and critique, 5) practice change recommendation, 6) piloting the change with evaluation and subsequent full-scale implementation, and 7) evaluation of project (Titler et al., 2001).

Step 1. QMC is required to have a prior to discharge PSD screening protocol in place to retain their comprehensive stroke center certification. This primary trigger, considering their lack of a screening protocol, led the QMC stroke coordinator to select PSD screening as a topic in need of review. The weight of the requirement for a PSD screening and feedback given during their initial comprehensive stroke center review in October 2016 indicated that this topic was an organizational priority for QMC worth pursuing.

Step 2. According to Titler et al. (2001) the next step was to form a team to spearhead efforts to address the clinical topic selected. This was done through collaboration with the stroke coordinator in which all stakeholders and potentially interested contributors to the project were identified. Potential team members were approached in person and through electronic correspondence to assess interest and potential levels of involvement. This process led to the formation of the PSD screening protocol team that contributed to the final product.

Step 3. With a topic selected and support garnered it was time to search all relevant literature. The Doctor of Nursing Practice (DNP) student compiled a final body of 28 articles that would be used to guide the production of a PSD screening protocol. The details of the search strategy and results can be found in chapter 2.

Step 4. Once the evidence had been gathered it was then graded utilizing a standardized tool and sorted according to levels of evidence. This was done by the DNP student and presented to the group for review. During a multi-disciplinary team meeting early in the project, a decision was made that the evidence base was sufficient to move forward with the project.

Step 5. Moving along with the IOWA model it was time to create a preliminary recommendation for a practice change (Titler et al., 2001). This process required the integration of the best available evidence with QMC stakeholder values and clinician insight. To begin, a qualitative survey was sent out to all stakeholders of the project that would be directly responsible for the PSD screenings. The survey was accompanied by an email containing a brief review of the literature with findings that included a preliminary recommendation for a specific screening instrument. Questions addressed how the clinicians felt about the findings, what their real world experiences had been in regards to PSD, and how they felt the need for a screening protocol could be best addressed given all recent and relevant data.

The responses were critical in developing the final protocol. Feedback from all potential screeners was gathered and reviewed by the core PSD project team. Commonalities in the responses were given weighted significance in the design of the final protocol. With all relevant data, QMC values, and clinician input considered it was time to pilot the final recommendation.

Step 6. Titler et al. (2001) recommends piloting a practice change with evaluation prior to full-scale implementation. This period allows for reinvention to take place and is also

congruent with Rogers' (2003) concept of allowing potential adopters the opportunity to trial a new innovation as a means of enhancing its chances of success. The final protocol created was piloted on a single QMC neurology unit for two weeks. Feedback from the screeners was then gathered throughout and reviewed by the PSD project team. Adjustments to the screening protocol's interventions were made as needed and a full-scale implementation was conducted.

To enhance the project's visibility educational sessions were held with staff RNs and providers to discuss PSD and its important implications regarding a stroke patient's rehabilitation. Email reminders were sent out to reinforce the live date for the protocol and a poster was created and displayed in the pilot unit's lounge. Every four weeks during the four-month implementation period outcomes related data was reviewed and further adjustments to the program were made as needed.

Step 7. To ensure the program met its original objectives, a final evaluation of the project was conducted after the four-month intervention period. The template for the final evaluation was finalized prior to implementation using the CDC's framework for program evaluation. Utilization of the CDC's framework was intentional as it is designed to protect the validity and integrity of non-experimental projects. It does this with an emphasis on stakeholder input and four key standards that anchor the evaluation plan (Milstein & Wetterhall, 2000). These standards include feasibility, utility, propriety, and accuracy. The final evaluation involved comparing the data gathered during the implementation period with the defined CDC framework outcome measures to determine whether project objectives were met. The final evaluation has and will continue to guide the future of the PSD screening program as it grows.

Timeline

The timeline for activities related to the implementation through dissemination of results steps of this project are presented in figure 4. Activities presented represent critical steps that must be completed in the appropriate order prior to moving ahead.

TASK	2017									2018					
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Prepare & Submit QMC PI vs. Research Form (IRB)	X														
Finalize Protocol with Core Stakeholder Group	X														
Successfully Defend Proposal			X												
Final Core Stakeholder Group Meeting Prior To Live Date			X												
Create and Disseminate Marketing Resources		X	X	X											
QCIPN PSD Webinar Training			X												
Educate Staff		X	X			X									
Develop Database		X													
Implement Practice Change					X	X	X	X							
Data Collection and Entry					X	X	X	X							
Implementation Data Review and Reinvention with Core Stakeholder Group					X	X	X	X							
Final Data Entries									X						
Analyze Data									X						
Interpret Data/Write Chapters				X	X	X	X	X	X	X					
Oral Defense											X				
Graduation														X	
Prepare & Submit Dissemination Products															X

Figure 4. Timeline of tasks to be completed from IRB approval through publication and dissemination of results.

Application of Users

Rogers (2003) discusses in his theory of innovation the need for the presence of a culture of change within an organization for the successful adoption of new practices. Individuals who believe in change, and are not stifled in their pursuit of it, are the ones who build this type of culture. They either have the authority to make that change happen or are willing to be the force of change as directed by others. These change agents and change champions respectively are fundamental to the success of any new practice change and examples of each can be found within this project.

The change agents for this DNP project include the QMC stroke program coordinator and QMC's lead neurology research physician. Both are dedicated to the culture of change within their practice setting and are motivated by external mandates as well as a pension for what's best for the patient. In addition to their forward thinking work ethic, both have the authority to mandate the changes they envision. Their support was crucial to the long-term success of this project.

In contrast to the change agents, the change champions of this project include those individuals who believe in change but do not have the direct authority to make final decisions. Change champions for this project include the PSD team's data expert, DNP student, and two neurology unit providers who championed the project from its inception. These individuals were key in the early and rapid dissemination and adoption of this innovation. The two neurology unit providers, as well as one specific neurology unit RN, were the opinion leaders for this project. Opinion leaders are individuals that certain staff look to for assurance when faced with change and who have some measure of authority (Rogers, 2003).

Adopter Categories

Rogers (2003) describes a bell curve in relation to a new innovation that illustrates the cultural phenomenon of adoption within a larger group. The bell curve is divided into categories that each describes different people based on their willingness to adopt change. These categories include the innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003). The classification of adopter categories assists the change agents to develop strategies specific to the needs of each group, thereby increasing the rate of adoption.

Innovators. Innovators are those who are willing to experience new ideas with little to no encouragement (Rogers, 2003). They do so despite known potential failures and financial losses. For these reasons, this group requires the least amount of effort to convince that a change is worth adopting. As the implementation of a PSD screening protocol was mandated and so carries with it minimal risk, there was little opportunity to identify innovators in the case of this project. That being said, the stroke program at QMC has a healthy culture of change that is lead by their stroke program coordinator.

Early Adopters. The majority of the PSD screening team could be considered early adopters as most of them hold leadership roles. Their attitudes about this innovation carried significant weight as they are looked upon by a majority of their staff as role models. Their positions gave them considerable influence over the rate of adoption of this PSD intervention.

As preventative innovations have few immediately visible benefits special consideration to Rogers' (2002) article about preventative innovations was utilized to encourage the early adopters. These recommendations include eliciting ongoing feedback, reinforcing the innovations relative advantage, encouraging this group to actively promote the innovation to

their respective colleagues, and to reinforce the need for preventative services (Rogers, 2002).

Early Majority. This category consists of those individuals who are not in leadership roles but have influence over a large portion of the social network where an innovation is being introduced (Rogers, 2003). Within the scope of this project the early majority consists of the providers administering the screening tool and the RNs who care for stroke patients. As secondary users of the innovation, those not directly administering the screening instrument, the RNs' attitudes about the intervention were important to consider. The RNs helped tremendously with patient education and in encouraging provider screening compliance. Staff educational sessions and feedback systems were also utilized to increase adoption in this category.

Late Majority. The late majority includes those individuals who wait until most of their peers have trialed a new innovation prior to adoption (Rogers, 2003). To increase the rate of adoption by this group the same strategies for the early majority were utilized. Additionally, administrative mandates and surveillance of compliance were used to further encourage adoption for the late majority.

Laggards. This group represents the last of the users to adopt a new innovation. Their hesitation is in part due to an entrenchment in tradition, closed social systems, and a lack of opinion leadership (Rogers, 2003). Laggards in this project include the outpatient providers who would be responsible for continuing PSD care post-discharge. These providers represent silos of care where each is socially isolated from the next, which limits the diffusion rate normally enhanced by social contact. Unfortunately, ongoing surveillance is one of the long-term objectives of this project and can only be completed by this group.

One strategy used to reach a segment of this group was the creation and presentation of a PSD webinar that all QCIPN providers were invited to join. QCIPN providers receive credit for viewing these types of resources. The credit received is put towards increased reimbursement rates from Medicare and Blue Cross. This proved to be a very real incentive that helped to increase the rate of adoption in this project's laggard group. Non-QCIPN providers were the most difficult to reach and their participation required ongoing attentiveness to the patient's discharge note, direct provider communication per protocol, and an ongoing community dialogue about PSD.

Social Systems

Diffusion of an innovation occurs through a social phenomenon and as such its rate is influenced by the characteristics of individual users (Rogers, 2003). The rate of diffusion of an innovation is additionally affected by the social systems in which it is being implemented. As defined by Rogers (2003), social systems are the interrelated units that are united in their joint problem solving of common goals. For this evidence-based project, the primary social system is the QMC stroke program, which includes the providers and RNs of QMC's two neurology intensive care units. The secondary social system is the QMC organization that the first is embedded within.

QMC is a non-profit acute care medical facility founded in 1859 and located in Honolulu on the island of O'ahu. Its primary mission is to provide high quality health care services to improve the well being of all people in Hawai'i (About the Medical Center, 2017). With over 539 beds and nearly 3,600 employees QMC offers a full spectrum of services that range from the promotion of health and wellness to caring for Hawai'i's most critically ill (About the Medical Center, 2017). As a Magnet designated hospital, QMC is additionally invested in promoting

evidence-based practice throughout its organization. In addition to its large size, complexity, and interconnectedness, QMC's organizational culture of innovation helped to facilitate a rapid diffusion of this project (Rogers, 2003).

QMC's stroke program is the primary social setting where data will be collected for this project and includes 12 neurology unit providers, stroke program coordinator, and all neurology unit RNs. The program's mission is to provide state-of-the-art medical care to patients with neurological diseases through the integration of clinical excellence, education, and research (About Us, 2017). The providers, who are a mix of physicians and APRNs, were the primary users of the proposed innovation and it was their compliance with the protocol and knowledge of PSD that was measured. During an average month in 2016 this team cared for 50 patients with a primary diagnosis of stroke. Although finalized protocols used to care for stroke patients at QMC are technically made using an authority structure, the stroke team providers report utilizing a consensus model to build proposed changes.

Sample

The target populations for this project include all patients with a primary diagnosis of stroke and the providers that care for them. The accessible populations for data collection will include all patients with a primary diagnosis of stroke being cared for within QMC's two neurological intensive care units and the 12 stroke program providers that care for them. Baseline data was collected just prior to implementation and represents screening rates for the previous twelve months. Post implementation data was then collected after the four-month intervention period. The final sample size for the stroke patient group was determined at the conclusion of the intervention phase of this project. With over 100 patients, the final sample size was adequate enough for a final evaluation.

Inclusion criteria for stroke patients included those who were admitted with a primary diagnosis of stroke. Exclusion criteria for the stroke patients included an inability to participate in the screening per provider judgment. Inclusion criteria for the provider group included designation as a neurology unit provider. Exclusion criteria included those providers from disciplines outside of the neurology department. Although they represented a component of the stroke program's social setting and aided in overall compliance with the protocol, the neurology unit RNs were apart of the data collection.

Stakeholder Engagement Plan

Successfully implementing a lasting evidence-based intervention within the healthcare system requires a strong multi-disciplinary approach where all those affected by a new intervention are considered. Those individuals affected, including those involved in implementation and the primary users of the innovation, are considered stakeholders in the project (Milstein, Wetterhall, & CDC Evaluation Working Group, 2000). These stakeholders are valuable sources of input and are best integrated when they are actively identified and their values considered throughout the life of a project. The strategy of ongoing stakeholder engagement was used throughout this project and served to guide the three conceptual models utilized.

The CDC Framework for Program Evaluation, the conceptual roadmap guiding the evaluation step of the IOWA model, highlights the importance of stakeholder engagement in creating a credible and valid evaluation. Using the four CDC standards of utility, feasibility, propriety, and accuracy stakeholder input is gathered and synthesized into operationalized benchmarks through which the evaluation is filtered (Milstein et al., 2000). The four standards are presented in Figure 5. Without the collaborative effort of the stakeholder group to define both

what they would value in an intervention and how to judge the success of that intervention, a valid evaluation could not be completed. It is this formal agreement of judgment that is the defining feature of an evaluation that takes place in real time where the ability to control for all variables is absent (Milstein et al., 2000).

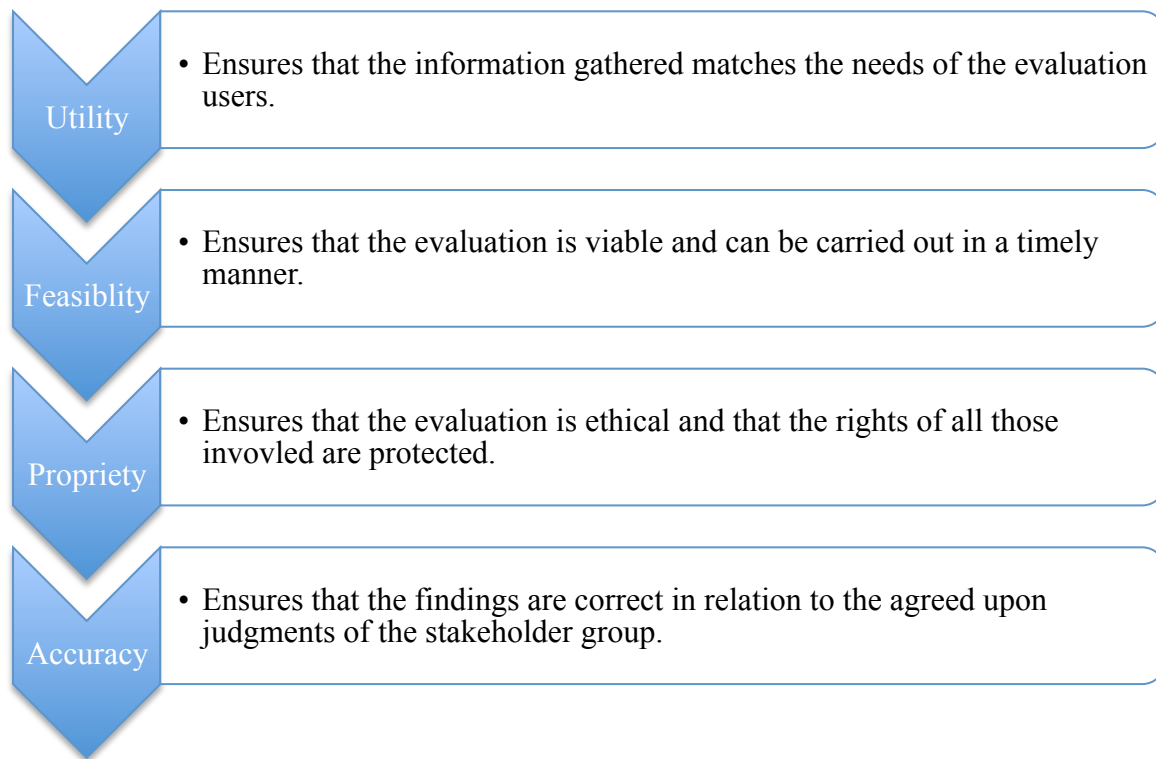


Figure 5. Definitions of each of the four CDC standards of program evaluation. Adapted from “A Framework Featuring Steps and Standards for Program Evaluation” by Milstein, Wetterhall, and CDC Evaluation Working Group, 2000, Milstein, *Health Promotion Practice*, 3, p. 221–228.

Stakeholder engagement, as just described in the CDC’s framework for evaluation, is equally important to the IOWA and the Rogers Diffusion of Innovation models. Step two of the

IOWA model requires forming a team to carry out a project to address an identified clinical problem (Titler et al., 2001). Identifying those individuals, or stakeholders, affected by the clinical problem and actively involving them in the decision making process greatly enhances the success and effectiveness of a proposed intervention (Titler et al., 2001). Stakeholders can further be characterized by their potential willingness to adopt the proposed intervention. Intentionally including stakeholders from each of Rogers (2005) adopter categories, with a consideration of their corresponding traits, can help facilitate a rapid diffusion of a proposed intervention.

The initial core stakeholder group responsible for the implementation and evaluation of this project included the QMC stroke program coordinator and DNP student. It was through these two that step one of the IOWA model, identifying the clinical problem, was initiated. Once the need for a PSD screening protocol was identified, additional stakeholder input was actively sought out during a monthly multi-disciplinary stroke team meeting in October 2016. QMC's data management expert and their lead neurology research physician both expressed interest during the initial meeting where the project was announced and became the next stakeholders to be included in the PSD team. Brainstorming sessions conducted through in-person meetings, phone calls, and emails helped to identify the final core stakeholder roster.

The core stakeholder group consists of those individuals who are considered most instrumental to the successful implementation of this PSD project. Importance of each individual, along with his or her input and effort, was determined using principles from the IOWA model, Rogers Diffusion of Innovation Model, and the CDC's Framework for Program Evaluation (Titler et al, 2001; Rogers, 2005; Milstein et al., 2000). Taking from Titler et al. (2001), stakeholders in positions to make organizational level decisions were included given

their ability to set organizational priorities. From Rogers (2005) model, stakeholders who were considered opinion leaders and change champions were also included due to their ability to encourage the rapid diffusion of the project and their authority to enact change. The CDC's framework further helped to both identify different types of stakeholders as well as offered suggestions for how to gather and integrate their input to ensure reliable results.

Initial engagement strategies included the use of a CDC interests and support worksheet that helped to determine the level of involvement each member wanted. Additional CDC tools helped to identify what each stakeholder valued most and what their ideas of a successful implementation were. Throughout this project stakeholder input from the core group was continually sought after in all decision-making as well as during the implementation and evaluation phases of this project. This was done through the use of email based surveys, group emails, monthly in-person PSD team meetings, and informal dialogue in the clinical setting. All other stakeholders affected by the intervention were engaged through the use of mass media and interpersonal communication channels as suggested by Rogers (2005).

Application of Communication Processes

Rogers' (2005) diffusion of innovations model is the guide through which the implementation step of this project was conducted. Part of implementation, as discussed by Rogers (2005), is the processes through which new information is shared with those adopting an innovation. Strategic use of these processes, or communications among stakeholders, requires a combination of strategies. The importance of any given strategy depends upon where in the implementation phase a project is and who the target audience is meant to be. As discussed in the previous section, ongoing stakeholder engagement throughout the life of this project was

fundamental to its success. Engagement involved the use of both mass media and interpersonal communication channels as described by Rogers (2005).

Mass Media. Mass media communication channels are meant to reach individuals that represent many different groups of potential users. They are also effective in creating awareness about a change, which is beneficial in gaining the support of innovators and early adopters (Rogers, 2005). Providing information to all those affected by a change is additionally beneficial in the knowledge stage of the innovation-decision process as described by Rogers (2005). For these reasons the initial stage of implementation for this project included the use of mass emails, unit poster boards, a QCIPN webinar, and regular stroke program announcements. Just prior to and during the implementation of this project email surveys were sent to the primary users of the intervention for ongoing feedback related to operational concerns. After the implementation and evaluation of this project was completed, results were disseminated through public forums, mass emails, and stroke program announcements.

Interpersonal Communication. Whereas mass media is effective at generating an initial sense of awareness related to a proposed change, it is through interpersonal communication that decisions about adoption are made and kept (Rogers, 2005). One on one, preferably in-person, conversations about the details and opinions of an intervention are crucial during the persuasion stage of the innovation-decision process (Rogers, 2005). It is important to have a strategy in place to steer the conversation during implementation in a positive direction and to allow for feedback by all those affected to be heard. This was achieved through actively encouraging the previously described change champions and change agents to engage their peers and employees. This allowed for positive reinforcement to flow outward into the greater stakeholder group and for concerns to be voiced back to the PSD team. Additional interpersonal communication

strategies utilized included in-person staff training, monthly PSD team meetings, and informal weekly on-unit check-ins with primary users.

Evaluation Plan

To ensure this evidence-based implementation project met its defined outcomes related objectives an evaluation plan was created. The evaluation plan presented in the following sections was designed using the CDC framework for program evaluation (Millstein & Wetterhall, 2000). Each step of the framework was followed using consistent and ongoing stakeholder feedback that was purposefully solicited to ensure the integrity and validity of this project's findings (Millstein & Wetterhall, 2000). To guide the evaluation step of the IOWA model and to focus the evaluation plan for this project an evaluation question was created.

The evaluation question reads will the introduction of a provider administered evidence-based PSD screening protocol increase the percentage of eligible patients with a primary diagnosis of stroke screened and appropriately referred for depression to 90% prior to discharge in the neurological intensive care units at QMC over a three-month period? Using SMART criteria, each component of the evaluation question was carefully selected so that specific operational definitions of each could be created. Very specific operational definitions, as mutually agreed upon by the core stakeholder group, are crucial in the creation of an evaluation plan that has outcomes that are measurable. SMART criteria used to craft the evaluation question are defined in Figure 6.

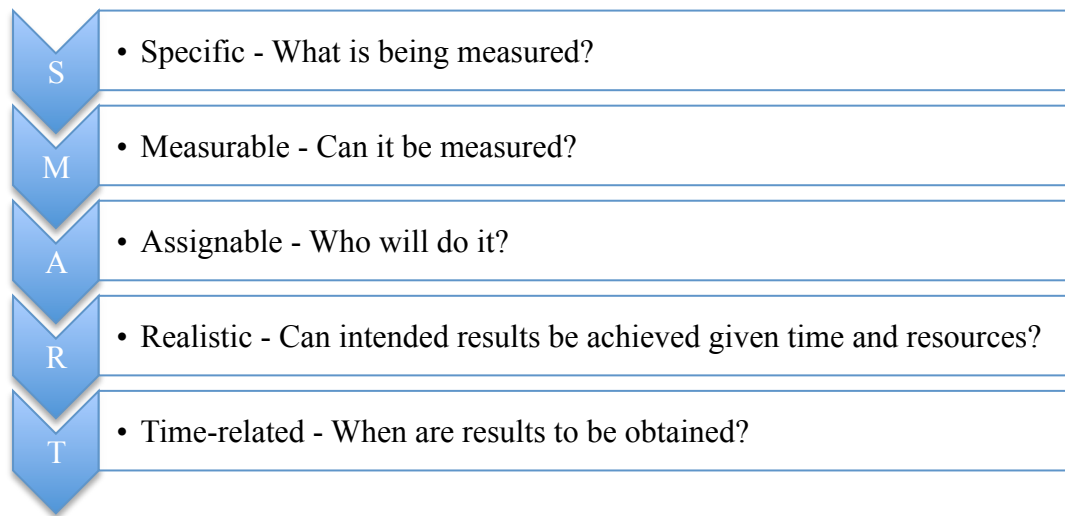


Figure 6. S.M.A.R.T. criteria components defined and clarified.

Integrity of Evaluation Design

The CDC's framework for program evaluation is anchored by four standards that are meant to help ensure that the integrity and validity of an evaluation design are maintained. As discussed previously in the stakeholder engagement section, it does so with an emphasis on stakeholder input (Milstein, Wetterhall, & CDC Evaluation Working Group, 2000). The four standards of utility, feasibility, propriety, and accuracy, previously presented in figure 1, help focus the input of the stakeholder group and the evaluation design as a whole. Judgments and values related to each standard are eventually synthesized into a formal agreement that clearly states what is meant to be measured, operationalized outcome measures, what a successful implementation looks like, and how evaluation data is to be used and disseminated. The integration of ongoing stakeholder input with consideration for the CDC's four standards help ensure that the validity and integrity of a project that is taking place in real time are maintained (Milstein et al, 2000).

To answer the evaluation question of this project a mixed process and impact evaluation design was utilized to help describe how a PSD screening protocol will impact the lack of appropriate screening of QMC patients whom were admitted with a primary diagnosis of stroke. Consideration for the four CDC standards was critical in maintaining the integrity of this project's evaluation design.

Utility. Utility has to do with ensuring that evaluation plan results will be useful and relevant to the needs of the stakeholder group (Milstein et al., 2000). For this project, the stakeholders have defined utility as evaluation results that are able show the TJC that screening compliance has been achieved, that PSD screening captures the majority of eligible patients, and that appropriate protocol interventions have been carried out. The stakeholder group further identified the need for this data to be gathered and presented prior to the next TJC review in early 2018. The stroke program coordinator and the neurology providers will actively use the results of this evaluation to maintain their comprehensive stroke center designation and to further develop post stroke behavioral health monitoring programs.

Feasibility. An evaluation plan is deemed feasible if all planned evaluation activities can realistically be carried out given available resources (Milstein et al., 2000). During stakeholder engagement meetings it has been emphasized that the final PSD protocol needs to be simplistic and easy to integrate into the workflow of neurology unit providers. Outcomes related data also needs to be easy to extrapolate from patient health records and all results need to be presented prior to the end of 2017. It was the consensus of the group that the implementation and evaluation plans were feasible given the proposed timeline and availability of support.

Propriety. Propriety has to do with ensuring that all ethical concerns are considered. A major concern of all stakeholders, especially those involved in administration, was that the rights

of all participants of the project were protected. These rights included the protection of patient and provider health related information. To avoid a breach in participant rights, all data was reviewed by the stroke program coordinator in a locked office and de-identified prior to dissemination to the PSD team for further analysis. There was no need to collect or present data with patient identifiers.

Accuracy. The CDC defines accuracy as the ability of an evaluation to produce valid results that answer the questions of those who need them (Milstein et al., 2000). The accuracy of this evaluation was maintained through engaging all stakeholders in the analysis and interpretation of project results. Initial stakeholder engagement produced operationalized definitions of what a successful implementation looks like and how to measure that success. In relation to the main concern of all stakeholders, that stroke patients be screened for PSD, outcomes data related to screening rates of all eligible stroke patients was collected during the implementation phase. This data helped answer the evaluation question, which reflects the values and judgments of the core stakeholder group.

Program Description

QMC's comprehensive stroke program's purpose statement includes the provision of state-of-the-art medical care to patients with neurological and neurosurgical diseases through the integration of clinical excellence, education, and research (About Us, 2017). QMC's comprehensive stroke program does this through adhering to an exhaustive list of guidelines and competencies as mandated by TJC. These guidelines, which can be found in Appendix D, include meeting performance measures that relate to the delivering of care to stroke patients from the time they arrive to the hospital through their discharge and follow up. This project's

evidence-based intervention tied into the provider's discharge process of QMC's stroke program patients within the 4D and 5D stroke units at QMC.

Prior to discharge, providers are required to complete a final assessment of their stroke patients, conduct patient education, and ensure that all discharge plans are finalized. The operational workflow related to this process begins the evening prior to discharge by a night shift nurse practitioner (NP). The night shift NP completes a discharge summary draft, reviews educational content, and goes over the treatment plan with the patient and their families. The morning of discharge the neurology unit physician assigned the patient to be discharged does a final round with the patient to answer any remaining questions. The final step involves the physician answering any remaining questions by the patient and their families and the submission of a finalized discharge summary.

From the patient and patient's family's perspective, this process can be overwhelming due to the acute stroke event and the amount of information being received. This potential problem of information overload and an overwhelming of a patient's ability to cope with their situation is further exacerbated by decreasing lengths of stay for stroke patients in the inpatient setting. Patients are presented with discharge instructions related to follow-ups, rehabilitation, and medications. They are further educated about long-term anticoagulant therapy, potential for future strokes, community resources, and general stroke related information.

Prior to this project QMC did not address the potential for the development of depression after having had a stroke. The need for such patient education and for a screening protocol was identified in the literature as previously discussed. Also discussed, and the main trigger for this project, is the mandate by TJC for comprehensive stroke center designation of having a prior to discharge PSD screen.

The intervention carried out in this project was designed to add a layer of behavioral health surveillance that was missing and to address the project's main triggers. Although the discharge workflow was already saturated for QMC neurology providers, the integration of an easy to use PSD screener was important and necessary given an overall lack of screening. The addition of the PHQ-2 to the discharge process helped allow QMC's stroke program to retain their comprehensive stroke center designation as well as to mitigate the potential consequences of depression on stroke patient rehabilitation.

The protocol additionally attempted to help patients beyond their inpatient stay, as it required providers to communicate PSD screen results to outpatient providers in their discharge summaries and via secured personal communications. All positive screens were offered an SSRI prescription for one month with instructions to follow up with their primary care providers and/or neurology specialist. The prescription of an SSRI helped act as an additional bridge of surveillance for depression as the outpatient providers were responsible for ongoing assessments of SSRI need. Ultimately, this intervention required a small addition of effort on the part of QMC neurology providers to add a large benefit to stroke patients and their health related outcomes.

Evaluation Plan Definitions

Prior to the design of an evaluation plan the core stakeholder group must carefully consider and agree upon the definitions of each project component (Millstein & Wetterhall, 2000). Definitions relating to the problem being addressed, the proposed intervention, baseline data, evaluation type, desired outcomes, and the sample population are presented here in their conceptual and operational forms. The first of which is the problem being addressed and is conceptually defined as an identified need to screen for depression in all stroke patients. The

operational definition includes the need to screen for PSD in all eligible patients with a primary diagnosis of stroke at QMC to maintain comprehensive stroke center designation by TJC.

To address this clinical problem a PSD screening protocol was created. The evidence-based intervention included the use of the PHQ-2 followed by a third question relating to a patient's desire to be on an SSRI. The protocol included guidelines for specific interventions related to the assessed severity of the patient's depressed mood. Titler et al. (2001) includes defining the comparison intervention that a proposed change is meant to replace in her IOWA model. A comparison intervention is what an institution is currently doing to address the same clinical problem as the one being addressed. In the case of this project the comparison intervention was the absence of any standardized behavioral health screening in stroke patients at QMC.

Evaluation of this evidence-based PSD screening project was done using a process and impact design. An impact evaluation allowed the PSD team to determine the effect of the intervention on the target population through an analysis of outcomes related data (Center for Disease Control and Prevention, 2014). To bolster the validity of the impact evaluation, a process evaluation was also conducted to ensure that the protocol was implemented as intended and that the results being gathered were applicable to desired outputs (Center for Disease Control and Prevention, 2014). The process evaluation further served as a feedback channel during the initial implementation phase so that changes to the protocol could be made as needed. To help measure the overall impact of the intervention baseline data, or data collected prior to a practice change, was collected. Baseline data for this project included the percentage of eligible patients screened for PSD and referred as needed during the previous year prior to the implementation of this project.

Outcomes are defined as the intended impacts of an intervention and can be divided into process and impact ones. Process outcomes are those that identify whether or not an intervention is being implemented as intended. The conceptual definitions for this project's process outcomes included an increase in provider comfort discussing and screening for PSD as well as accuracy of completed screens. These definitions are operationalized as an increase in provider comfort discussing and screening for PSD as measured by qualitative survey results, the achievement of 90% of eligible patients being screened appropriately during implementation, and 90% accuracy of completed screens. The first process outcome represented a mediating factor in the overall success of this project. Mediating factors are those forces in a project's implementation that may adversely affect the intended outcomes. Ensuring providers are aware of PSD and how to screen for it helped mitigate this mediating factor.

Impact outcomes were those outcomes that helped identify whether the goals of the intervention were met and what effect the intervention had. Conceptual definitions for these outcomes included the percentage of eligible patients screened for PSD and the actual PHQ-2 screening results. As with the process outcome the project's impact outcome related to screening compliance hoped to achieve an overall 90% screening rate by intervention's end. The screen results did not have a specific goal but would instead inform further research and practice changes related to PSD. During the initial implementation phase preliminary data reviews helped trigger meaningful conversations with the providers administering the screening tool to see what barriers they were facing. This helped ensure the intervention was being implemented as intended.

For the purpose of this project, those that were included in the project's implementation were defined as the sample populations. Inclusion criteria for this project's sample included

those patients with a primary diagnosis of stroke that were admitted to a QMC neurology unit during a four-month implementation phase. Exclusion criteria included those patients that could not participate in a depression screen as determined by the neurology unit providers. A second sample worth clearly defining in relation to this project's outcome measures includes the providers responsible for administering the intervention. Inclusion criteria for this group included those providers at QMC that work in the neurology units.

Data Management Plan

Step 4 of the CDC's framework for program evaluation includes the process of gathering credible evidence (Millstein & Wetterhal, 2000). This step was started in the previous section with the careful and purposeful creation of definitions relating to the components of this project's evaluation question. Once the definitions were crafted and desired outcomes operationalized, the PSD project team created a data management plan (DMP) that formally outlined how data would be handled for this project. As with each step of this project, stakeholder input was once again critical. Including stakeholders in the DMP helped ensure that the evaluation question was answered using techniques that were considered credible by all those eventually utilizing the evaluation plan's results. Millstein & Wetterhall (2000) illustrate this point in their discussion of how a collectively constructed DMP can help avoid credibility issues relating to defining outcomes, quality of data, data sources, and the logistics of data gathering.

Data quality is the cornerstone of ensuring that an evaluation of a project produces credible, reliable, and valid results as interpreted by stakeholders. Without accounting for quality, an evaluation runs the risk of gathering data that does not directly measure the thing it is meant to measure. To help ensure that the data gathered in this project is informative to the evaluation question, the PSD team discussed many factors that could potentially influence data

quality. Factors discussed and considered in the final DMP included the complexity of data gathering procedures, complexity of data gathered, where data would be gathered from, and appropriate training of all individuals gathering data. As will be described in more detail, this DMP's strongest asset is its simplicity.

To further ensure the credibility of this project's evaluation, data sources were carefully selected. The data sources were categorized according to whether they would provide process or impact related data. The first process outcome required a data source that would measure whether provider comfort discussing and screening for PSD had been enhanced. Pre and post qualitative survey responses from the QMC neurology unit providers were analyzed to provide the appropriate data.

Providers were additionally graded during implementation to determine their compliance with the protocol. The data source for this, which was additionally an impact related data source, was the EMR at QMC. The EMR provided access to provider discharge summaries. The specific data elements being measured were the PHQ-2 results from each patient's discharge summary as well as the providers PSD care plan. The PHQ-2 and care plans were standardized using a dot phrase that providers used during their discharge visits. A final analysis of data from this source helped answer the project's primary evaluation question of whether 90% of eligible stroke patients were being screened for PSD prior to discharge from QMC neurology units.

Prior to implementation an educational in-service with the neurology unit providers was conducted. Once the implementation was rolled out the PSD team's data management expert and the stroke program coordinator collected data every four weeks. They both accessed patient charts, which they used to record the number of eligible stroke patients that were screened for PSD. They additionally recorded, in a yes or no fashion, whether the protocol's interventions

were carried out appropriately. Data was de-identified and aggregated prior to dissemination to the PSD team. Both data collectors had prior authorization to access patient charts and did so in their locked offices to ensure patient confidentiality.

Analyzing the data gathered was the final step in the DMP and helped inform the 5th step of the CDC's framework for program evaluation that includes justifying all conclusions (Millstein & Wetterhall, 2000). As mentioned previously, this DMP benefited from its simplicity. There is one process outcome and just two well-defined outcome related measures that two well-qualified PSD team members were responsible for gathering data on. As the data related to the impact measures was gathered it was added to a spreadsheet for final analysis. Individual spreadsheet pages corresponded to four-week implementation intervals. Columns on each page included patient gender, if patient was eligible for screening, whether patient was screened, whether screen was complete, results of screen, whether SSRI was prescribed, whether patient education was complete, and additional comments.

Throughout the analysis of data the PSD stakeholder group was included. This was accomplished at interval in-person meetings with the core stakeholder group and during a final multi-disciplinary stroke team meeting. Data was compiled into a presentation designed to show the results of each data measure. A discussion then followed to analyze the findings, how they answered the evaluation question, and to consider alternative meanings behind the results. The final discussion of the data prior to the dissemination of results helped ensure the final product was credible, valid, and useful.

Project Resources

Successfully implementing this EB project required considerations for the resources available to it within the QMC system. Without the appropriate finances, individual effort, time,

and physical resources this intervention could not be operationalized. Utilizing the notion of stakeholder feedback from both the IOWA model and the CDC's framework for program evaluation, determinations about resource needs were been made through consensus agreements (Titler et al, 2001; Millstein, Wetterhall, & CDC Evaluation Working Group, 2000). Input was actively sought out from stakeholders during team meetings, emails, and online surveys.

Financial. Fortunately for this project, the finances needed to implement EBP initiatives within the QMC stroke units had already been allocated in the annual budget for 2016. The budget made room for staff training hours, cost of changing the EMR, and money for media campaigns. A preliminary submission for the proposed change was approved and finances allocated.

Human Capital. Identifying, designing, implementing, and evaluating a new intervention requires the effort of many individuals to successfully complete. During initial stakeholder meetings estimates of the level of human input required were made. To make sure that the needed effort was available a CDC stakeholder engagement tool was utilized. The tool required each stakeholder to mark his or her level of preferred involvement. Based on data from this tool and further meetings with the core stakeholder group it was determined that the effort needed was available and that it would not tax the stroke program beyond its capacity.

Time. A timeline of activities related to implementation was created and agreed upon by all stakeholders involved with the intervention. Part of the creation of the timeline was a discussion about potential barriers to a successful implementation and whether there was time to adjust as needed. The final consensus was that a four-month implementation period would be ample time to change the behaviors within the stroke program as needed for the PSD screen to be a success.

Physical. The only two physical resources required by this project include a space to collect, synthesize, and store outcomes data and wall space for the mass media campaign. Both resources were identified. Data was stored in the stroke program coordinator's locked office and each of the two units volunteered wall space for poster presentations.

Dissemination Plan

The final step of the CDC's framework for program evaluation involves ensuring that the results and lessons learned from a program evaluation are used (Millstein & Wetterhall, 2000). Consideration for this step was integrated into each of the previous steps of this project to help design an evaluation plan that would be useful and approachable for the target stakeholder audiences. These audiences included members of the QMC stroke program, QMC neurology unit providers, and TJC. Dissemination plans for each audience were similar but were created separately to account for the different needs of each group.

Findings interpreted from data gathered during this project's implementation period were put together into graphical content. The graphical content was included into a power point presentation that was presented at the January 2018 multi-disciplinary stroke team meeting. This meeting provided an opportunity for the PSD project team to disseminate their results to the representatives of all departments involved in the QMC stroke program. Copies of the power point were sent out to these representatives and further dissemination was encouraged within their respective departments. This face-to-face interaction encouraged rapid dissemination of the results throughout the QMC organization (Rogers, 2003).

QMC's neurology unit providers were addressed separately during their regularly scheduled monthly meeting in January 2018. Disseminating results directly to this group of stakeholders was crucial as it will be through their behavior change that the new PSD protocol is

maintained. The presentation included many of the same elements as the multi-disciplinary team meeting power point but also included an emphasis on sustainability. Reinforcement of the project's success was included, as was a discussion about further improvements and responsibilities.

The primary trigger of this project was the need for a prior to discharge PSD screening protocol to maintain comprehensive stroke center designation at QMC. To ensure this need was met the results of this evaluation were additionally tailored to TJC. Outcomes related content was made available for TJC as they eventually determine whether QMC has fulfilled the PSD screening mandate. To enhance the visibility of the PSD screening protocol, the PSD team also produced an executive summary of the project. This summary includes a discussion of the project's methods and results. The executive summary was also disseminated to all QCIPN Providers to further encourage on-going surveillance of PSD in the outpatient setting.

The long-term viability of this PSD project hinges on ongoing stakeholder feedback and support. This was consistently accounted for throughout the entirety of this project and will continue beyond its conclusion. Stakeholder engagement was additionally relevant to ensuring that the practice change was adopted during the persuasion stage of adoption as discussed by Rogers (2003). Giving a voice to all those affected by this project created buy-in that will hopefully help sustain the practice change.

Three PSD team members who have bought-in and whom have expressed interests in taking on the responsibility of ensuring the long-term success of this project include the stroke program coordinator, lead neurologist, and the QMC data management expert. Their interest was identified using a CDC program evaluation stakeholder interest tool and from ongoing PSD team meetings. It will be through their continued support that this project sustains into the future. The

longevity of this project has also been bolstered by TJC's mandate for PSD screening prior to discharge. This primary trigger, and impetus for this project, will encourage continued support from those in positions to carry out and sustain change within the QMC organization well beyond this project's conclusion.

Human Subjects Considerations

This project was been designed in such a way as to protect the rights of all human subjects involved. As an EBP initiative there were no plans to randomize subjects to different treatment groups. In forgoing randomization and applying the designed protocol to all eligible patients the ethical tenet of justice was maintained. Eligibility was determined by inclusion and exclusion criteria that include all patients with a primary diagnosis of stroke and who can meaningfully participate in a depression screening as determined by their provider. Reasons a patient may not be able to participate in screenings include impaired ability to communicate and/or severe cognitive impairment. This PSD screening protocol incorporated the best available evidence into a standardized guideline to help ensure all patients receive the same level of care ensuring the ethical principle of justice.

The PSD protocol maintained the ethical tenet of autonomy for patients and the neurology providers performing the screen. Although TJC mandates PSD screening prior to discharge, the proposed guideline is not binding for the provider group. They will retain their right as autonomous practitioners to screen patients as they see fit moving forward. Likewise, patients maintained their autonomy through their right to refuse the PSD screening process. This PSD screening protocol additionally adhered to the ethical tenet of non-maleficence, as it did not cause any undue harm to stroke patients. The screen was not used to diagnose patients with

depression, which could have potentially stigmatized them in the eyes of insurers, family members, and outpatient providers.

In fulfilling an identified clinical need, this project fulfilled the ethical tenet of beneficence. Patients are believed to have benefited from the increased depression surveillance through mitigating the potential adverse effects of untreated depression (Towfighi et al., 2017). This EBP also did not add any additional risks to patients or providers beyond the provision of standard care. During the evaluation phase of this project all patient and provider data was de-identified by the QMC data expert prior to dissemination to the PSD project team. No identifiable data related to this project and its outcomes were stored or are retrievable.

To ensure patient and provider's rights were protected to their fullest extent, the DNP student completed a University of Hawai'i required Collaborative Institutional Training Initiative course in human subjects protection. Additionally, a committee consisting of faculty and clinical experts reviewed this project to ensure adequate human subjects protection. A summary of these considerations and the project's intended practice change was submitted to QMC for IRB approval. It was their determination that this project represented an EBP without significant risks to patients and therefore did not require an IRB approval process.

Limitations

There are many limitations that are inherent to the implementation of an EBP initiative and as such apply to this project. The first limitation is that the implementation of this project took place in real time, in a fluid environment, and without the ability to control for variables. This reduces the overall generalizability of the project's evaluation findings, even as they may be applied to different times of the year at the same facility. The sample for this project was a convenience one where inclusion criteria were broad. Additionally, the final sample's size and

characteristics were not known until the end of the four-month implementation phase. It is likely that the sample does not adequately represent the characteristics of the larger state population.

Another major limitation of this project is the limited evidence to support the use of the PHQ-2 in the acute care setting. This instrument is further limited, as the yes/no version used is different from the multiple response version studied in most of the literature. As there is no clear sensitivity and specificity determined for this instrument in the PSD population, this project's data quality may be diminished. Additional limitations for this project include the heterogeneous nature of the group of providers who will be administering the screen, the limited implementation period, and the reliance of chart reviews to pull outcomes related data.

Summary

This chapter has detailed the implementation and evaluation plans for this project as well as discussed the required resources, plan for dissemination of results, considerations for human subjects, and the project's limitations. The discussions relating to implementation and evaluation further described the integration of the three conceptual models being utilized to guide this project that include the IOWA model, Rogers Diffusion of Innovation model, and the CDC's framework for program evaluation. The creation of this chapter was a culmination of the efforts by the PSD project team in conjunction with ongoing and frequent stakeholder input.

Chapter 4. Results

Objectives

The purpose of this evidence-based project was to develop and implement a PSD screening protocol at QMC to address the potential psychological complications of having a stroke. Triggers for this project included The Joint Commission (TJC) mandate for a prior to discharge PSD screening protocol for comprehensive stroke center designation, known consequences of untreated PSD related to stroke rehabilitation, and a real gap in behavioral health surveillance for stroke patients. Prior to this project QMC's stroke program did not have a standardized screening protocol in place to address the potential for depressive symptoms in their stroke patient population. The objectives of this project were to establish an in-patient PSD screening protocol at QMC, encourage continuity of PSD screening and care to the outpatient setting, and to increase provider comfort discussing and screening for PSD with their patients. The following chapter details the final sample characteristics and results of this project's four-month interventional period.

Description of Sample

Prior to the initiation of this project's intervention the core stakeholder group and PSD team agreed upon inclusion and exclusion criteria for each sample group. Inclusion criteria for the patient group included all those patients that were admitted and discharged with a primary diagnosis of stroke from the QMC neurological intensive care units. Exclusion criteria for the stroke patients included an inability to participate in the screening per provider judgment. Provider reasons for exclusion included an inability to communicate, deficient cognitive ability to participate meaningfully in depression screening, or patient refusal. Inclusion criteria for the

provider group included designation as a neurology unit provider at QMC. Exclusion criteria included those providers from disciplines outside of the neurology department.

The final sample of stroke patients captured over the four-month period included 121 patients of which 35 were removed prior to data analysis. Over the course of this intervention it was decided that, in addition to deceased patients, all patients transferred to another acute care facility would not be considered for final analysis. This determination was based on the logic that those few patients transferred to other facilities were typically in a terminal condition where PHQ-2 screenings was unnecessary. In total, 35 patients were removed with 26 patients dying prior to discharge and nine transferred to outside facilities. Of the 86 patients retained there was a near 1:1 male to female ratio. No additional demographic data was captured due to concerns about patient confidentiality.

The final sample of providers included 3 neurological physicians and 9 acute care nurse practitioners. All 12 providers were present during the four-month intervention period and each was responsible for completing at least one PSD screen. No additional demographic data was captured related to the provider group.

Trend Analysis for Process and Outcome Variables

As discussed in chapter three, an impact evaluation of this project was conducted to allow the PSD team to determine the effect of the intervention on the target population through an analysis of outcomes related data (Center for Disease Control and Prevention, 2014). To bolster the validity of the impact evaluation, a process evaluation was also conducted to ensure that the protocol was implemented as intended and that the results being gathered were applicable to desired outputs (Center for Disease Control and Prevention, 2014). Prior to this project's implementation the core stakeholder group agreed upon definitions related to process and

outcomes related variables to ensure accurate data was collected. The final PSD screening data totals and each data collection period's data can be found in Appendix E.

Process Variables

This project's process variables included provider comfort discussing and screening for PSD, mid-intervention screening compliance rates, and the accuracy of completed EMR screens. Provider comfort discussing PSD as well as provider screening compliance rates were both considered process and outcomes related variables and will be discussed as each in the outcomes section.

Accuracy. To ensure this project's protocol was being implemented as intended the PSD data collection team scored each provider's EMR screen as either complete or incomplete. A complete score meant that the provider followed the appropriate PSD algorithm correctly from beginning to end. If the provider missed a step or omitted any documentation, regardless of PHQ-2 results, then the screen was scored as incomplete. The overall accuracy of all screens was determined by dividing the number of complete screens by the number of screens attempted. After the initial six weeks of the interventional period the provider group had an accuracy rate of 70%. Over the next four weeks their accuracy improved slightly to 75%. The two weeks following showed a jump in accuracy to 100%, which the team was then able to maintain through the final four weeks.

Analysis of the provider's documentation allowed the PSD team to identify common errors that led to the initial low accuracy rates. The two main errors were the deletion of protocol sections by the providers and a failure to document reasons for not providing patient education. After reviewing and comparing the PSD protocol algorithm with the protocol in the EMR the PSD team was able to better understand the providers' logistical problems. Instructions about

where to go from each step were unclear and there was no option or instructions related to documenting reasons for not completing a section of the protocol. These uncertainties were removed in an updated version of the protocol, which had a significant effect as evidenced by the eventual jump mid intervention to 100% accuracy of all screens attempted.

Outcome Variables

Outcome variables for this project included provider comfort discussing and screening for PSD, provider screening compliance rates, PHQ-2 results, and Queen's Clinically Integrated Physician Network (QCIPN) screening rates. Each will be discussed separately.

Provider Comfort. During an early pre-intervention round table discussion with QMC neurology unit providers it was determined that there was some unease discussing and screening for PSD. This led to an initial email to the provider team that contained an educational PSD handout that included information about PSD, its potential for significant harm, and tips for discussing it with their patients. Attached at the end of the email were instructions to complete a pre-intervention survey that was meant to assess a new baseline comfort in screening for PSD in the provider sample group. The initial four-question survey was completed by 10 of the 12 providers.

The first question read, on a scale from 0 to 5 how satisfied are you with the current screening process. The average response was 2.89. The second question read, on a scale from 0 to 5 how confident are you in using the PHQ-2 to screen for PSD? The average response was 3.63. The third question read, on a scale from 0 to 5 how comfortable are you discussing the potential for the development of PSD with stroke patients? The average response was 3.78. The final question read, do you feel the screening process in place now is adequate in detecting PSD risk in stroke patients? The majority, at 66%, responded no. This survey gave the implementation

team an idea of where the providers were at with screening for PSD and how much more provider education would be beneficial to the overall success of the project's main objectives.

At the conclusion of the four-month interventional period a second survey was sent to the provider staff that was identical to the first. This allowed the PSD team to quantitatively assess whether the intervention itself and their provider education efforts had any effect on the project objective of increasing provider comfort assessing for PSD. Results of the second survey showed a positive effect across all questions although the response rate was much lower with just 5 out of 12 responses. The first question again read, on a scale from 0 to 5 how satisfied are you with the current screening process. The average response was 4. The second question read, on a scale from 0 to 5 how confident are you in using the PHQ-2 to screen for PSD? The average response was 4.2. The third question read, on a scale from 0 to 5 how comfortable are you discussing the potential for the development of PSD with stroke patients? The average response was 4. The final question read, do you feel the screening process in place now is adequate in detecting PSD risk in stroke patients? The majority, at 80%, responded yes.

During implementation regular communication between the PSD team and provider staff took place during staff meetings, floor discussions, and emails. This helped reinforce the educational material presented to the providers about PSD and gave the providers a chance to offer feedback about the new screening process. Additionally, the PSD educational pamphlet given to all stroke patients was designed so that a provider could use it as a prompt for initiating a discussion about PSD and as a transition into the PHQ-2. Comfort with the new screening protocol and in discussing PSD increased steadily throughout the intervention as evidenced by provider feedback, screening accuracy rates, screening compliance, and final survey results. The ongoing assessment of provider comfort with PSD and PSD screening allowed the PSD team to

ensure that their protocol was being implemented as intended. The final assessment of this variable additionally allowed the PSD team to determine the impact of their interventions on one of the project's main objectives.

Compliance Rates. At four points during the four-month intervention period a data analysis was conducted to determine periodic screening compliance rates. To aid in the reinvention process it was considered necessary to track compliance throughout this intervention. Periodic compliance checks allowed the PSD to identify common errors or omissions in the new screening process, which further allowed the team to augment the protocol and/or provide further education as needed. Compliance rates were determined by dividing the number of eligible patients screened by the number of eligible patients. The first data analysis was conducted after the initial six weeks of the interventional period and showed a compliance rate of 79% out of 29 data entries. The next four weeks showed a compliance rate of 87% out of 23 data entries. The two weeks following had a compliance rate of 90.5% out of 21 data entries. The final four weeks of the intervention showed a compliance rate of 93% out of 14 data entries.

Chart reviews of each patient screened allowed the PSD team to identify reasons patients were not being screened appropriately. The number one reason was that patients were being screened with an outdated screening tool located in the QMC EMR. Although providers were screening their patients for depression they were doing so without the new protocol and so these screens were marked as misses. The only other reason identified was that providers were simply not offering or not documenting any screening for depression. Ongoing reinforcement with the provider team during regularly scheduled meetings was used to mitigate these errors. As the protocol was fine-tuned throughout the interventional period and as providers got more comfortable with the screening process the rate of compliance steadily increased to above the

target goal. The final average compliance rate over the four-month interventional period was 86%. By the final six weeks, however, the team elevated their compliance rate to just above the 90% goal for this project's compliance objective.

PHQ-2 Results. The patient-centered focus of the screening protocol implemented at QMC during this project was the administration of the PHQ-2 to detect early depressive symptoms in stroke patients. Of the 86 patients that were included in data analyses, 74 were screened with the PSD screening protocol. Of those 74 patients, 13 were deemed inappropriate for the PHQ-2 due to their inability to participate per provider judgment. Provider reasons for exclusion included lack of cognitive ability, aphasia, and patient refusal. Of the 61 patients screened with the PHQ-2, 7 screened positive and 54 screened negative for depressive symptoms. The final prevalence rate of depressive symptoms for this sample of stroke patients was 11.5%. Of the 7 patients that screened positive for depressive symptoms, 3 were initiated on an SSRI.

Outpatient Screening. To encourage continuity of care the PSD team had hoped to measure the effects of outpatient outreach efforts in the QCIPN community on 90-day post stroke discharge screening rates. Project interventions aimed at increasing QCIPN outpatient screening rates included a August 2017 PSD webinar for all QCIPN providers, patient discharge summaries with PSD screening results, and the direct communication of all positive PHQ-2 screens to QCIPN patient providers. Unfortunately, due to a lag in claims data and a change to patient data storage all of this information is not yet available for the period this intervention took place. In 2016 QCIPN providers performed zero 90-day post discharge depression screens for stroke patients. Data for 2017 was only available through June and revealed a 90-day post

discharge screening rate for stroke patients of 11.6%. Although the modest increase in screening rates is reassuring for stroke patients it cannot be attributed to this project's efforts.

Evolution of Project

This project began with the simple idea of adding a layer of behavioral health screening for stroke patients that at the time was missing. This led to an initial literature search and review that then yielded a recommendation for a change in practice. Operationalizing the practice change went smoothly considering that behavioral change is a difficult endeavor under most circumstances. A discussion of the expected versus actual outcomes as well as what aided and hindered this project follows.

Expected vs. Actual Outcomes

The expected versus actual outcomes of this project were more or less congruent with the exception of the PHQ-2 results. In the literature, 33% is the accepted prevalence rate for depressive symptoms following a stroke at any time during recovery (Hackett et al., 2005). The PSD team expected to show similar prevalence rates in their QMC sample, however, this was not the case. The prevalence rate was much lower at 11.5%.

Facilitators

This project benefited tremendously from the efforts of a small team of QMC providers that were dedicated to fixing a recognized gap in care for their stroke patients. The open culture of change that this team already embodied prior to this project allowed for a smooth integration of the proposed screening protocol. Team leadership by the stroke program coordinator further assisted the rapid dissemination and adoption of this project's innovation. Regular communication between the stroke program coordination, PSD team, and neurology providers

was instrumental in the rapid achievement of the project objectives related to accuracy of screens and provider compliance rates.

Barriers

The only major barrier to the implementation and success of this project was the laborious process of changing the QMC EMR. Making permanent changes to the EMR requires approval by multiple committees before the act of changing it can even begin. Due to the time constraints of this project a permanent change to the EMR was never accomplished. Changes were instead created using what are called dot phrases. These dot phrases are short phrases that when entered into a text box on the EMR loads a preset protocol. This meant that providers had to delete old sections of their discharge summaries and replace them with the new protocol using dot phrases. Given the difficulty in changing provider behaviors, this added layer of complexity was a significant barrier to the success of this project. Fortunately, the project's facilitators overcame this barrier and the project was a success.

Summary

This project set out with intentions to establish an in-patient PSD screening protocol at QMC, encourage continuity of PSD screening and care to the outpatient setting, and to increase provider comfort discussing and screening for PSD with their patients. It did so with the creation of a PSD screening protocol at QMC that was used to screen 86 patients over four months. This chapter reflects the results of the data gathered during the four-month implementation period. Process variables for this project helped the PSD team ensure that their protocol was being implemented as intended and that the data gathered was accurate. Outcome variables for this project helped the PSD to identify the impact of their interventions and whether the project

objectives were met. A discussion and interpretation of this project's findings will follow in the next chapter.

Chapter 5. Discussion

Interpretation of Findings

This project's objectives included establishing an in-patient PSD screening protocol at QMC, encouraging continuity of PSD screening and care to the outpatient setting, and increasing provider comfort discussing and screening for PSD with their patients. Chapter four presented an analysis of the data collected during this project's implementation period. This chapter will focus on the interpretation of that analysis and what it means in relation to the project's objectives, stroke patient care, and the larger body of evidence related to PSD.

Provider Comfort and Compliance

Stroke patients are believed to suffer from PSD at a prevalence rate of 33% at any given point in time during their recovery (Hackett et al., 2005). Of those patients, it is assumed that nearly 80% go undetected and therefore untreated for their depressive symptoms (El Husseini et al., 2012). Two potential reasons stroke patients are left untreated for their depressive symptoms include that providers are both unaware of PSD as a significant complication of having had a stroke and a general lack of discomfort discussing depression with their patients. Both of these contributing factors were found to be the case in this project where the provider group expressed an initial lack of awareness about PSD and unease about discussing PSD with newly diagnosed stroke patients. To eliminate these barriers to adequate behavioral health surveillance interventions were designed to educate the provider group.

The education and support the provider staff received in relation to PSD led to a steady increase in their confidence related to PSD screening. This was evidenced both by their pre and post intervention survey responses and their achievement of the project's compliance goal. By project's end the compliance rate for providers was 93%. This meant that not only were

providers screening the majority of their patients but that they were engaging in patient education related to PSD as well. By reinforcing the provider's knowledge base related to PSD, how to discuss it, and how to screen for it this project was able to elevate the care stroke patients received during the acute care phase of their recovery. This is especially true considering pre intervention QMC stroke patients were receiving neither PSD screening nor PSD education. Although the evidence base is unclear as to what can help prevent PSD, it is believed here that early and ongoing assessment of PSD will be shown to mitigate the potential effects of PSD in future research.

Outpatient Screening Rates

It is unfortunate that this work cannot accurately report on the effects of the outpatient outreach interventions designed by this project. The lack of follow-up data is related to a lag in claims information and a change in the data warehouse used by the QCIPN mid intervention. In August 2017 a PSD webinar was offered to all QCIPN providers to enhance their awareness about PSD and to introduce them to the new QMC screening process. The hope was that this intervention, along with the new discharge summaries and direct provider-to-provider communication of all positive screening results, would lead to enhanced outpatient behavioral health surveillance for stroke patients.

A major objective of this project was to encourage a continuity of care for QMC stroke patients as they transitioned out of the acute care setting. This objective was important to the PSD project team due to the fact that PSD has been shown to develop at different times for different patients during their recovery process over five years post stroke (Towfighi et al., 2017). Although this objective cannot be confirmed due to a lack of data it is believed that the project's work and future plans of the QMC stroke program will eventually lead to this objective

being fulfilled. QMC's stroke program has already begun to see their discharged stroke patients at an in-house stroke patient follow-up clinic. During visits at the stroke program's follow-up clinic patients are screened once again for PSD. Eventually, QMC will be one of the only facilities nationally to be able to track PSD data for their own patients as they transition from the acute care into the outpatient setting.

Screening Results

The purpose of this project was to establish an in-patient PSD screening protocol at QMC to mitigate the potential effects of PSD. This purpose statement was designed based on national statistics related to the prevalence and consequences of PSD. Until this project however, no work had been done in Hawai'i that illustrated the prevalence of PSD in the local population. The screening results in this project represent the first glimpse into how many local patients are affected by PSD in the acute care phase of their stroke recoveries.

Of the 61 patients screened with the PHQ-2 there were 11.5% that screened positive for depressive symptoms. This is well below the 33% prevalence rate typically attributed to PSD but still shows that PSD is present in the immediate post stroke period. Explanations for the gap in prevalence rates include the short interventional period, use of a deficient screening tool, and decreasing lengths of stay for stroke patients. The four-month period of data collection may not adequately represent the local stroke patient population and their prevalence of PSD. More data will need to be collected and analyzed in the future to determine the true prevalence of PSD in Hawai'i.

The yes/no PHQ-2 screening tool utilized in this project has not been as adequately validated in the stroke patient population as other screening tools. It is possible that the screening tool is deficient in the acute care setting or for stroke patients in general. Finally, the average

length of stay for stroke patients during this intervention was 6.3 days. This is considerably shorter the average length of stay for stroke patients in the majority of PSD literature (Meader, et. al, 2014). It is possible that decreasing hospital stays for stroke patients may somehow contribute to a lower diagnostic rate of PSD.

The PHQ-2 results from this project show that stroke patients in Hawai'i do suffer from depressive symptoms following an acute stroke event. Given that prior to this project no standardized PSD screenings were offered at QMC it is reasonable to conclude that a gap in patient care was fulfilled by this project. Although TJC may eventually repeal their mandate for a prior to discharge PSD screening protocol, the results of this project have convinced the stroke program coordinator of the ongoing utility of PSD screening. Further research in the area of PSD prevention and treatment will be needed to shed light on the exact contribution that early PSD screening has on reducing post stroke complications.

Project Implications for the Doctor of Nursing Practice

The American Association of Colleges of Nursing (AACN; 2006) is responsible for publishing a comprehensive set of curricula that all DNP programs are expected to provide their students. Contained within the curricula are eight DNP essentials that each prospective DNP graduate must master by the conclusion of their studies. Detailed below is a description of how each of these essentials was addressed by this practice change project.

Essential I: Scientific Underpinnings for Practice

DNP prepared nurses must have the ability to integrate and to draw upon multiple scientific disciplines in their practice settings. This is necessitated by the increasing complexity of healthcare delivery and the expectation that DNP graduates will seek out leadership positions where they will be tasked with systems level change. This particular DNP project drew upon

three scientifically based conceptual models to guide each step of the process. The master template for this project was taken from the IOWA model of evidenced based practice, which details a step-wise guide for translational science within nursing (Titler et al., 2001).

Rogers Diffusion of Innovation Theory (2003) is a social science theory that was utilized to aid in the dissemination of this project's proposed intervention. Rogers (2003) social diffusion model helped guide this project's marketing strategies as well as aided in developing strategies to include all stakeholders in the design and implementation processes. The final conceptual model utilized in this project was the CDC's program evaluation guide. In utilizing tools and concepts from the CDC model this project was able to ensure a high level of quality and validity related to the interpretation and dissemination of its findings. This project additionally considered and integrated the principles of holistic healthcare, the nursing code of ethics, and concepts from the Collaborative Institutional Training Initiative into each step of the process.

Essential II: Organizational & Systems Leadership for QI & Economics

DNP graduates must be able to effectively navigate complex organizational settings and to wield systems level leadership to deliver equitable healthcare (AACN, 2006). The design, implementation, and evaluation of this project required consideration for the culture, policies, and preferences of QMC, the QMC stroke program, the QMC neurological intensive care units, and the QMC stroke program's provider team. This complex web of organizational units required the project team's leadership to demonstrate systems level leadership strategies tailored to the specific needs of individual groups. The foundation of this project's leadership style was rooted in ongoing stakeholder engagement. This was done through communication channels designed to elicit quality feedback from all those affected by the intervention.

Stakeholder engagement is highlighted in both the IOWA model and the CDC program evaluation guide as a means to ensuring buy-in as well as sustainability of practice change initiatives (Titler et al., 2001; Center for Disease Control and Prevention, 2014). Stakeholder engagement was additionally utilized as a transformational leadership strategy where information gained was used to set clear goals, create an emotional connection to the project, encourage ongoing commitment, and to draw-upon as well as to build up each person's contributions. Throughout implementation, and with stakeholder engagement, this project's team successfully navigated the implementation of a patient-centered intervention that maintained patient safety while being cost-effective and sustainable.

Essential III: Evidence-Based Practice/Translation Science

Evidenced-based practice requires that research be translated into everyday clinical practice through an intentional process. The process is often complex and time consuming with the result being a significant delay between research findings and integration into practice. Integration can be enhanced, however, with the use of an individual trained in translational science that utilizes a sound translational model. DNP essential III describes what it means to master the translational process as a doctoral nurse and parallels the steps of the IOWA model. The first step in the IOWA model is to identify clinical triggers that signal a need for change relating to a practice topic (Titler et al., 2001). Once triggers are identified, a practice change topic selected, and enough interest gained there remain six steps in the process: 2) forming a team, 3) literature search, 4) literature review and critique, 5) practice change recommendation, 6) piloting the change with evaluation and subsequent full-scale implementation, and 7) evaluation of project (Titler et al., 2001).

The IOWA model significantly enhanced this project's success through its clear step-wise guide and associated tips for a successful implementation. Within step four of the model Melnyk's Hierarchy of Evidence was utilized to grade and critique all articles found. An important component of the translational process is being able to identify quality research so as to determine whether the quality and or quantity of content located are sufficient to support a practice change. In this project the body of evidence was deemed sufficient to move ahead. Part of the decision to move forward was based on the fact that the literature clearly identified gaps in care at QMC and potential benefits to a change in practice. This project concluded with a final dissemination of all findings to QMC and the public so that its data could feed back into the research being done on PSD.

Essential IV: Information Systems/Technology

In our modern era of information and technological systems it is imperative that a DNP prepared nurse master the use of technology in their practice setting (AACN, 2006). This project drew heavily upon the electronic medical record (EMR) system at QMC for the design, implementation, and evaluation of the completed intervention. During the design phase it was necessary for the project team to become acquainted with the EMR as it was designed and how it fit into the workflow of the provider staff. This guided both the final decision on which screening instrument to utilize and how to integrate it into the EMR. The yes/no version of the PHQ-2 was eventually chosen, as it was simple, easy to integrate into the EMR, and was acceptable by the provider staff.

During implementation and evaluation the EMR provided the data the team needed for reinvention and to draw final conclusions about the project. As issues arose during implementation related to data collection, the PSD screening algorithm was tweaked to better

suit the providers and the EMR. DNP prepared nurses must also be ready to address technological barriers. For instance, at QMC the process of making permanent changes to the EMR is timely and requires multiple committees to sign off on a final product. As this did not work for this project's timeline, temporary changes were made using dot phrases by the provider staff. This was problematic at first as it greatly increased the complexity of the expected behavior change and led to an initially low compliance rate. In addition to the EMR, secure messaging systems were utilized to communicate between providers and with patients.

Essential V: Health Care Policy & Ethics

DNP prepared nurses are expected to advocate for policy changes at any and all levels related to the delivery of just and equitable healthcare. This includes advocating for the closing of any gaps in care identified. In the case of this project the DNP student and project team identified a significant gap in care for stroke patients related to the potential psychological complications of having had a stroke. One third of stroke patients are likely to experience depressive symptoms at some point following their stroke within five years (Hacket et al, 2005). Of those patients nearly 80% will be left undetected and therefore untreated (El Husseini, 2012). The project team further identified that untreated depression following a stroke is related to poorer health related outcomes including a 3.4 times increase in mortality (Paolucci, 2008).

Although a prior to discharge PSD depression screening program was mandated by TJC for comprehensive stroke center status at QMC, the project team advocated for outpatient monitoring to be included in the project. This was accomplished through reaching out to the QMC outpatient provider population via a PSD webinar, incorporating a direct provider communication tool into the screening process, and through ongoing QMC outpatient stroke clinic screenings. The mandate for in-patient screenings will likely be discontinued by the TJC in

the near future but the stroke program at QMC plans to continue the screening process. A big goal of this project was that awareness of PSD will be enhanced through the efforts of this project and that ongoing screenings will become more common statewide.

Essential VI: Inter-professional Collaboration

The core project team involved in this intervention consisted of a lead DNP student, registered nurses, advanced practice registered nurses, and physicians. This interdisciplinary team was able to effectively communicate their input throughout the process of this project. Collaboration among the disciplines enhanced the project's overall success and contributed to the probable sustainability of the intervention. Both communication and collaboration were enhanced with periodic team meetings, online surveys, and group emails. Team leadership actively included each discipline throughout the project's life including the evaluation of the final data results. Beyond the core team, updates and final results of the project were communicated to a much larger multi-disciplinary stroke team that has regularly scheduled monthly meetings as part of the QMC comprehensive stroke program.

Essential VII: Prevention and Population Health

The AACN describes essential VII as the ability for DNP prepared nurse to analyze bio statistical and epidemiological data in an effort to design healthcare initiatives that address a broad range of sociocultural issues related to specific populations (AACN, 2006). The population in this project included patients who were diagnosed with having had a stroke and the goal of the project was the secondary prevention of PSD in this population. After analyzing the available data the project team made the decision to design a healthcare initiative to address the gap in care previously discussed. Designing a PSD screening protocol at QMC required the team to have a multicultural approach. As QMC cares for patients of many cultural backgrounds it was

important to integrate culturally sensitive language into the screening and educational process of the project. The final intervention included translated PSD educational handouts as well as encouraged the provider's to use the hospital's translator services.

Essential VIII: Advanced Nursing Practice & Education

The final AACN essential of DNP practice details what it means to master the delivery of advanced primary healthcare. This essential includes the ability of a DNP prepared nurse to conduct a comprehensive history and physical, design therapeutic interventions, maintain therapeutic relationships with patients, demonstrate advanced levels of clinical judgment, educate fellow nurses, guide patient's through complex healthcare systems, and to navigate the complexities of healthcare themselves (AACN, 2006). This project required the use of each of these skills as patients were initially assessed for depression, prescribed therapeutic interventions, and were followed up with after discharge. The delivery of PSD screening and care required the nurse to demonstrate a strong understanding of the complexities of comorbidities, the healthcare system as it involves navigating specialist and case management, and the ability to educate fellow nurses about PSD.

Plans for Dissemination

The final step in the IOWA model for evidenced based practice is the dissemination of a practice change project's results (Titler et al., 2001). This step is critical so that institutions, including the one where a practice change was initiated, may benefit from the lessons learned during the implementation process. Although no two facilities are alike, the sharing of information related to practice change initiatives benefits the whole healthcare community. As for QMC, the dissemination of this project's results are critical to their comprehensive stroke certification process. On February 1st, 2018 the results of this project will be presented to the

QMC multi-disciplinary stroke program team. By March of 2018 the results of this project will be presented to the University of Hawai'i community as well as to the local community via an open attendance forum. A final dissemination of this project's results will be made available in an article published in a national journal on evidence-based practice and stroke related care.

Summary

This chapter reflects the interpretation of this project's findings, a relation of this project to the DNP essentials, and a timeline for the dissemination of this project's results. The purpose and first objective of this project was fulfilled as a PSD screening protocol was created and implemented within the QMC neurological intensive care units. This project was additionally able to meet its objective of improving provider comfort discussing and screening for PSD. Due to a lack of follow-up data the final objective of establishing continuity in care for stroke patients related to their behavioral health was unfortunately not directly met. Results from the PHQ-2 screens show that PSD is present in the Hawai'i stroke patient population. Although the exact effects of early detection for PSD are unknown this project's team hopes that it has helped start the conversation of how to mitigate the effects of PSD through early and ongoing screening.

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Appendix A

Table 1

Post Stroke Depression Screening Instruments

Screening Instrument(s)	Reference
HADS, BDI-II, BDI, WDI, GHQ, WSRS, GDS, BASDEC, SADQ-H	Bennett, H. & Lincoln, N.
SADQ-H, SODS, VAMS, VASES, HADS	Bennett, H., Thomas, S., Austen, R., Morris, & Lincoln, N.
BDI, HDRS, VAMS, Clinical Global Impression	Berg, A., Lonnqvist, J., Palomaki, H., & Kaste, M.
PHQ-2, PHQ-9	de Man-van Ginkel, J., Gooskens, f., Schepers, V., Schuurmans, M., Lindeman, E., & Hafsteinsdottir
PHQ-2, PHQ-2	de Man-van Ginkel, J., Hafsteinsdottir, T., Lindeman, E., Burger, H., Grobbee, D., & Schuurmans, M.
SADQ H10, BASDEC	Hacker, V., Stark, D., & Thomas, S.
WDI, BDI, GDS, HADS, MADRS, ZDS, PSE-8, CES-D, GHQ-28	Hackett, M., Yapa, C., Parag, C., & Anderson, C.
HADS, PHQ-9, PHQ-2, BDI, VAMS	Hollender, K.
PHQ-8	Husseini et. al
BDI, HADS-D, HAMD, MADRS	Kang, H. et. al
PHQ-8	Karamchandani et. al
GDS-15	Lewis-Richter, A., Volz, M., Jobges, M., & Werheid, K.
BDI, PHQ-9, PHQ-2, GHQ-12, GHQ-28, CES-D, GDS, GDS-15, ZDS, HADS-D, HDRS	Meadar, N., Moe-Byren, T., Llewellyn, A., & Mitchell, A.
PHQ-9, PHQ-2, HADS, BDI-II, DT, K-10	Turner, A., Hambridge, J.m White, J., Carter, G., Clover, K., Nelson, L., & Hackett, M.
PHQ-9	Williams, L., Brizedine, E., Plue, L., Bakas, T., Tu, W., & Kroenke, K.

Note. BASDEC, Brief Assessment Schedule Depression Cards; BDI, Becks Depression Inventory; CES-D, Center for Epidemiological Studies - Depression; DT, Distress Thermometer; GDS-15, Geriatric Depression Screen; GHQ-12/28, General Health Questionnaire; HADS-D, Hospital Anxiety Depression Scale - Depression; HAMD, Hamilton Depression Rating Scale; HDRS, Hamilton Depression Rating Scale; K-10, Kessler 10; MADRS, Montgomery-Asberg Depression Scale; PHQ-2, Public Health Questionnaire 2 item; PHQ-8, Public Health Questionnaire 8 item; PHQ-9, Public Health Questionnaire 9 item; PSE, Present State Examination; SADQ H10, Stroke Aphasic Depression Questionnaire 10 item; SODS, Signs of Depression Scale; VAMS, Visual Analogue Mood Scale; VASES, Visual Analogue Self-Esteem Scale; WDI, Wakefield Depression Inventory; WSRS, Wimbeldon Self-Report Scale; ZDS, Zung Depression Scale

Appendix B

STROKE DEPRESSION SCREENING

Step 1: Can patient meaningfully participate in PSD screen? (Y/N)

If **NO**, leave reason(s) for exclusion and discontinue protocol:

**Severe cognitive disability, inability to communicate, refusal,
other (document reason)**

Step 2: Reviewed PSD/SSRI handout with patient and/or patient's family. (Y/N)

If **NO**, leave reason(s) for not completing education:

**Interpreter not available, handout unavailable, refusal,
other (document reason)**

Step 3: Administer PHQ-2

PHQ-2:

1) In the previous two weeks have you experienced little interest or pleasure in doing things once enjoyable? (Y/N)

2) In the previous two weeks have you felt down, depressed, or hopeless? (Y/N)

If both answers are **NO** then skip to **Step 5**

If answer to either question is **YES** ask:

Do you believe you would benefit from an SSRI (antidepressant) prescription? (Y/N)

Step 4: SSRI prescribed? (Y/N)

Step 5: In addition to discharge summary, plan communicated with patient's PCP via:

Epic Inbox, phone, fax, other (document method)

Post stroke depression is the number one psychiatric complication following stroke with 33% of patients developing depression at some point during their recovery.

Appendix C

Life After Stroke: Facts and Tips about Sadness

After having a stroke, many people find it difficult to express the many feelings they have. Many of those feelings are related to the normal and healthy process of grieving the physical and mental function that may have been lost. Working through grief and sadness is good for you, however if those sad feelings last for a long time or get worse then your overall health and wellbeing can be harmed.

Signs of Depression

- Feeling extremely sad or “empty” most of the time
- Loss of interest or pleasure in activities once enjoyed.
- Fatigue or feeling “slowed down” beyond new changes linked to the stroke.
- Sudden trouble sleeping or sleeping too much.
- Sudden change in appetite.
- Increasing inability to concentrate, remember, or make decisions like you used to easily.
- Feeling worthless or helpless
- Strong feelings of guilt
- Ongoing thoughts of death or suicide, even planning a suicide.
- Crying all the time

What Can Be Done to Help?

Overcoming the challenges of your recovery from a stroke and feelings of depression can be improved when you:

- Discuss how you feel with your family, friends, counselor, and/or primary care provider.
- Consider taking medications for depression, research has shown that they may improve a stroke patient’s recovery of lost physical function through improved mood. Speak with your provider about the benefits of such medications.
- Spend time with the people you enjoy most.
- Seek help immediately if you or your family recognizes the signs of depression presented above.



Post Stroke Depression Facts

- Up to 1/3 of all stroke survivors get depressed sometime after their stroke.
- Depressive symptoms may happen immediately following a stroke, during rehabilitation/recovery, or even years later.

How Can Depression or Persistent Negative Emotions Affect Your Life?

- Slow down and/or stop your rehabilitation and subsequent recovery.
- Lower your quality of life.
- Increase your chances of complications, having another stroke, or death.



Appendix D

Advanced Disease-Specific Care Certification Requirements for Comprehensive Stroke Center (CSC)

A link to the full set of Advanced Disease-Specific Care Certification Requirements for CSC can be found here, http://www.jointcommission.org/assets/1/18/dsc_csc_chap.pdf -
http://www.jointcommission.org/assets/1/18/dsc_csc_chap.pdf

PSD specific requirement related to this project: **CSC Requirement: DSDF 2, EP 4, d-**
The patient is assessed to identify cognitive decline, depression and other social issues prior to discharge. (Note: This requirement is not applicable to comatose patients.)

Appendix E

Data Summary for data between July 31st and September 11th

Total Data Entries Kept: 29

Of 29 data entries kept,

Patients not screened: 6

- 3 used incorrect protocol
- 1 stand-alone note
- 2 unknown

Patients screened: 23

- 16 screens complete
- 7 screens incomplete

Screen results,

- 2 positive screens
- 16 negative screens
- 5 patients could not participate

SSRI prescription

- NO DATA

Summary

Compliance Rate (# of eligible patients screened / # eligible patients): **79%**

Accuracy (# screens completed appropriately / # screens completed): **70%**

Positive PHQ-2 Rate (# positive screens / # screens): **9%**

Adjusted Positive PHQ-2 Rate (# positive screens / # screens minus those that could not participate in PHQ-2): **11%**

Appendix E (Continued)

Data between September 12th and October 16th

Total Data Entries Kept: 23

Of 23 data entries kept,

Patients not screened: 3

- Reason not screened,
 - 2 used wrong protocol
 - 1 deleted protocol from d/c summary

Patients screened: 20

- 15 screens complete
- 5 screens incomplete

Screen results,

- 2 positive screens
- 15 negative screens
- 2 patients could not participate
- 1 missing data

SSRI prescription

- 2 continued current SSRI script
- 1 started new SSRI script

*Outliers (two incorrect protocols used)

- 1 screened positive and was given an SSRI script
- 1 screened negative

Summary

Compliance Rate (# of eligible patients screened / # eligible patients): **87%**

Accuracy (# screens completed appropriately / # screens completed): **75%**

Positive PHQ-2 Rate (# positive screens / # screens): **9%**

Adjusted Positive PHQ-2 Rate (# positive screens / # screens minus those that could not participate in PHQ-2): **12%**

Appendix E (Continued)

Data Summary for data between October 17th and November 7th

Total Data Entries: 21

Of 21 data entries kept,

Patients not screened: 2

- 2 used incorrect protocol

Patients screened: 19

- 19 screens complete
- 0 screens incomplete

Screen results,

- 1 positive screens
- 14 negative screens
- 4 patients could not participate

SSRI prescription

- 17 not prescribed
- 1 continued current SSRI script
- 1 started new SSRI script

Summary

Compliance Rate (# of eligible patients screened / # eligible patients): **90.5%**

Accuracy (# screens completed appropriately / # screens completed): **100%**

Positive PHQ-2 Rate (# positive screens / # screens): **5%**

Adjusted Positive PHQ-2 Rate (# positive screens / # screens minus those that could not participate in PHQ-2): **6.5%**

Appendix E (Continued)

Data Summary for data between November 8th and December 1st

Total Data Entries: 14

Of 14 data entries kept,

Patients not screened: 1

- 1 used incorrect protocol

Patients screened: 13

- 13 screens complete
- 0 screens incomplete

Screen results,

- 2 positive screens
- 8 negative screens
- 3 patients could not participate

SSRI prescription

- 13 not prescribed
- 0 continued current SSRI script
- 0 started new SSRI script

Summary

Compliance Rate (# of eligible patients screened / # eligible patients): **93%**

Accuracy (# screens completed appropriately / # screens completed): **100%**

Positive PHQ-2 Rate (# positive screens / # screens): **15.5%**

Adjusted Positive PHQ-2 Rate (# positive screens / # screens minus those that could not participate in PHQ-2): **20%**

Appendix E (Continued)

Data Summary for data between July 31st and December 1st

Total Patient Charts Reviewed: 121

Total data entries kept for analysis: 86

Total data entries removed: 35

- 26 patients deceased
- 5 transferred to hospice care
- 4 patients transferred to Kaiser in critical care

Of 86 data entries kept,

Patients not screened: 12

- 7 used incorrect protocol
- 5 protocols missing or mostly deleted

Patients screened: 74

- 62 screens complete
- 12 screens incomplete

Screen results,

- 7 positive screens
- 54 negative screens
- 13 patients could not participate

SSRI prescription

- 67 not prescribed
- 4 continued current SSRI script
- 3 started new SSRI script

Summary

Compliance Rate (# of eligible patients screened / # eligible patients): **86%**

Accuracy (# screens completed appropriately / # screens completed): **84%**

Positive PHQ-2 Rate (# positive screens / # screens): **9.5%**

Adjusted Positive PHQ-2 Rate (# positive screens / # screens minus those that could not participate in PHQ-2): **11.5%**

Gender Breakdown: **42 Females and 44 Males 1:1**